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Essentials of
GYNECOLOGY

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GYNAECOLOGICAL HISTORY

The most important evidence is always provided by the history given by the patient. In many cases a provisional diagnosis can be reached before starting detailed physical examination.

1. PERSONAL HISTORY:

- Patient's name, age, address, occupation, marital status, gravidity and parity
- Special habits of medical importance

2. COMPLAINT:

Complaint is written in the patient's own words as; excessive vaginal bleeding, pelvic pain, painful intercourse, progressive abdominal enlargement, mass filling or protruding from the vagina…

3. PRESENT HISTORY:

- Analysis of the onset, course, and duration, of the present complaint.
- Ask about symptoms relevant to, or associated with, the present complaint.
- Ask about symptoms related to other body system affection as; urinary, GIT, cardiac, pulmonary, neurologic, etc...

NB: **SEXUAL HISTORY:**in cases of infertility.

- ☐ Frequency of sexual intercourse (times /week)
- ☐ Associated symptoms; as presence of dyspareunia (painful intercourse).
- ☐ Husbands age, occupation, and any previous investigations for male infertility, previous marriage and children.

4. PAST HISTORY:

A) *Medical Disorders:*

- Systemic disease: hypertension, diabetes mellitus, cardiac, renal, liver disease.
- Endocrine disorders: thyroid, adrenal disorders...
- Blood dyscrasias: as ITP & von Willebrand disease (VWD).

B) *Drugs and Medications:* as ongoing medical or hormonal therapy.

C) *Surgical Procedure:*

- Gynecologic & Obstetric procedures; D&C, CS, Myomectomy, Hysterectomy.
- Relevant Surgical procedures: as pelvic surgery (appendicitis, peritonitis, pelvic masses) and bariatric procedures, Thyroidectomy…

5. MENSTRUAL HISTORY:

- *Age at menarche:* normally 11-13 years
- *Cyclic pattern:* normally every 25-32 days (mean 28 days)
- *Duration of bleeding:* normally 3-5 days.
- *Amount:* 30-50 ml/cycle, changing 2-3 blood soaked diapers/day.
- *Character of bleeding:* usually dark in colour with no or minimal clots.
- *Dysmenorrhea:* Menstrual pain and its relation to the onset of bleeding.
- *Last menstrual period (LMP):* calculated from 1st day of onset of menses.

6. OBSTETRIC HISTORY:

- Previous pregnancies and deliveries in sequence of their occurrence.
  - ☐ Duration of each gestation (term, preterm, or abortion)
  - ☐ Route of each delivery: vaginal delivery (VD), or caesarean section (CS)

  - ☐ The condition of the newly born: living, still born (SB), or neonatal death.
  - ☐ Complications related to pregnancy, delivery, and puerperium.
- Previous abortions:
  - ☐ Duration of pregnancy at occurrence of each abortion (1st or 2nd trimester)
  - ☐ Method of termination (spontaneous, medical, or surgical termination).
  - ☐ Post-abortive complications (bleeding, sepsis, infertility, etc...)
- The Obstetric Code: The obstetric history can be described for simplicity by either;

The 4 digit code (0000):

- ➢ First 3 digits: stand for duration of pregnancies (full term, preterm, & abortions).
- ➢ The 4th digit: stands for number of living offspring.

The Gravidity / Parity code (G0/P0):

- ➢ Gravidity describes the number of pregnancies, including the current pregnancy if present (term + preterm + abortions).
- ➢ Parity stands for number of previous deliveries (term + preterm).

- If present pregnancy is ongoing: establish LMP, EDD, and complaints related to each trimester.

NB: CONTRACEPTIVE HISTORY:

Methods used, by both partners, duration of its use, and time of its termination.

7. FAMILY HISTORY:

Inherited diseases, genetic disorders, and hereditary malignancies

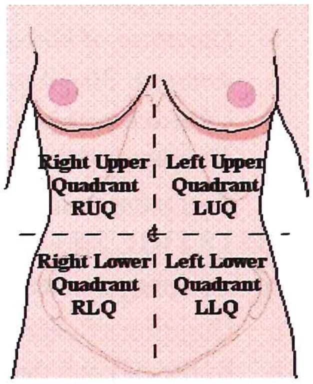
GYNECOLOGIC EXAMINATION

1. GENERAL EXAMINATION:

- ☐ Vital signs: Pulse, temp, and B.P.
- ☐ Gait, and body mass index (BMI) = weight kg /height in meter square
- ☐ Hair distribution and development of the secondary sexual characters.
- ☐ Breast examination is an important part of any gynecological examination.
- ☐ Inspection of the back: for spina bifida, hair tuft, severe kyphosis, or scoliosis.

2. ABDOMINAL EXAMINATION: bladder should be empty

- ***Inspection:*** abdomen exposed from costal margin till symphysis pubis;
  - ☐ Abdominal masses, scars of previous operations, pigmentation, etc…
  - ☐ Hernia orifices, and divarication of the rectii muscles (during straining)
- ***Palpation of all abdominal quadrants***
  - ☐ ***9 quadrants:*** (right and left hypochondrium, right and left lumbar, right and left iliac fossa, hypogastrium, umbilical, and suprapubic regains)
  - ☐ ***4 quadrants:*** (right and left upper quadrant and right and left lower quadrants)
  - ☐ Palpation for enlarged liver, spleen, renal, abdominal, and pelviabdominal masses.
- ***Percussion of the abdomen:***
  - ☐ Normally there is resonance in the center and in the flanks due to air in intestinal loops.
  - ☐ Tumors show uniform dullness all over the tumor area.
  - ☐ Moderate ascites shows central resonance (floating bowel) with dull flanks (fluid). Shifting dullness will occur when patient is turned on her side with upper flanks becoming resonant (due to shift of ascites to more dependent parts and intestines floating over fluid).



Abdominal Quadrants

- Tense ascites gives generalized dullness on percussion (fluid everywhere).

3. BREAST EXAMINATION

Breast Examination

Breast examination is an integral part of a comprehensive gynecologic examination. It is an important method for both **screening** for benign and malignant breast tumors, and **diagnosis** of breast conditions as a breast lump, fibrocystic breast disease, mastitis, breast abscess, and galactorrhea.

A) **Inspection:** with patient in upright position, for contour, symmetry, skin changes or nipple retraction.

B) **Palpation:** with patient in upright then supine position, of

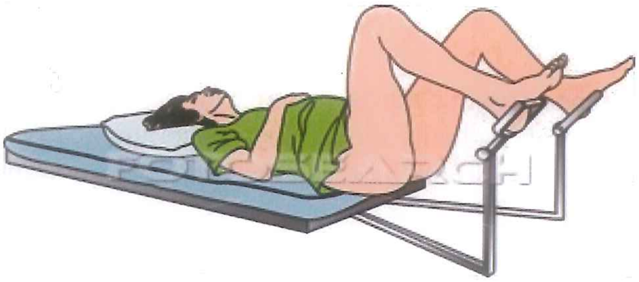
- The 4 breast quadrants, areola, and nipple with the flat of the hand
- Each axilla is examined for lymph node groups (medial, lateral and apical) while the patient's arm is supported.
- The supraclavicular fossae are also palpated for lymphadenopathy.

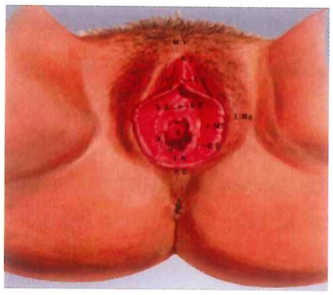
C) **Investigations** in case of presence of a suspicious lesion include:

- Breast Ultrasonography: especially 3D US for primary diagnosis and follow up
- Mammography & MRI: for highly suspicious palpable lesions and high risk cases (e.g.; BRCA gene positive women)
- Tumor marker as CA 15.3 may be also used.

4. LOCAL EXAMINATION

- Patient's attendance is by itself considered consent for a pelvic examination. However presence of a third party (a female relative or a nurse), is ethically important.
- The patient's bladder must be empty, and only disposable gloves should be used.
- Instruments used are either ***disposable*** or should be ***sterilized by autoclaving***, to avoid the risk of transferring infecting vaginal organisms from one woman to another.
- The patient is examined locally while lying down in the lithotomy position (see fig1-1)


Inspection of the vulva


Lithotomy position

A. Inspection of the Vulva and Perineum:

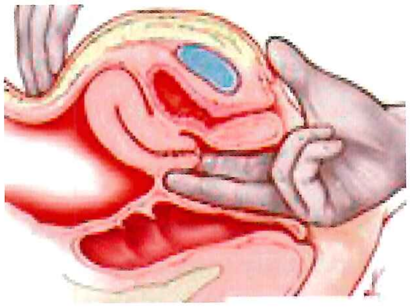
- *The vulva:* is inspected for anatomical abnormalities, swellings, tumors, warts, or ulcers, together with presence of abnormal vaginal discharge or bleeding.
- *The external urethral meatus:* for any redness, discharge, or presence of urethral caruncle.
- *The perineum:* for old lacerations, and the presence of piles around the anal orifice.
- *Inspection while straining:* for presence of genital prolapse and stress incon-tinence.

B. Digital Vaginal Palpation (PV):

The index finger is inserted into the vagina first, and as the patient relaxes, it is followed by the middle finger, and together slope gradually deeper in the vagina following its direction (upwards and backwards).

As the fingers are withdrawn, the following structures are palpated:

- ☐ *The cervix:* noting its size, consistency, mobility, direction, and level. Presence of lacerations, hypertrophy, dilatation, and any descent on straining, or any contact bleeding.
- ☐ *The vaginal walls:* palpated for any mass, ulcer, or fistulous opening.
- ☐ *The bladder and urethra:* can be palpated through the anterior vaginal wall.
- ☐ *The rectum and pouch of Douglas:* can be palpated through the posterior vaginal wall.
- ☐ *Bartholin's glands:* are palpated to detect any swelling.
- ☐ *The condition of the levators ani muscles:* can be determined by two fingers in the vagina, and the thumb on the perineum. *Fig 1-6: Bimanual Examination* Ask the patient to cough and feel the muscle as it contracts.



Bimanual Examination

C. Bimanual Pelvic Examination:

The index and middle fingers of the right hand are placed in the anterior vaginal fornix, while the left hand is placed flat on the abdominal wall.

1. Examination of the Uterus:

The vaginal fingers of the right hand should push the cervix upwards, rotating the fundus forwards. The abdominal hand is placed below the umbilicus and gradually moved lower suprapubically until the fundus is caught and pressed against the fingers of both hands in the anterior fornix, in AVF uterus, or at the posterior fornix in RVF uterus.

2. Examination of the Adnexa and Vaginal Fornices:

The fingers of the vaginal hand move towards one lateral fornix with the abdominal hand following, trying to gently squeeze the adnexa to palpate any masses, swellings, or elicit tenderness. The same procedure is then repeated in the other lateral fornix.

3. Examination of the Pouch of Douglas:

The vaginal hand is moved to the posterior fornix, while the abdominal hand follows trying to reach the vaginal fingers behind the uterus suprapubically.

Points to be Determined during Bimanual Pelvic Examination:

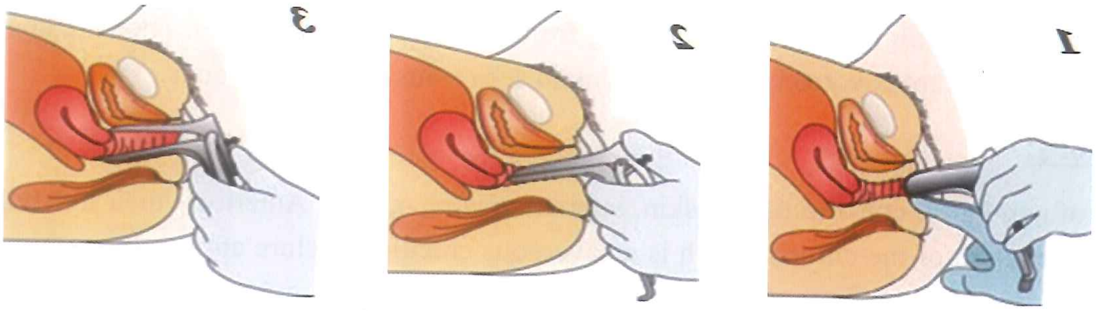
- ➢ **Uterine Size, Shape, Consistency, and Contour:** the uterus is a pear shaped organ with firm consistency, and smooth outer contour. It normally measures nearly 7.5 X 3.5 X 5.5 cm in Long/AP/Transverse, diameters. It may be felt with difficulty in women with marked trunk obesity.

- **Uterine Position:** The uterus is commonly Anteverted flexed (**AVF**) in position, with the external os pointing towards the posterior fornix. In nearly 20% of cases the uterus is retroverted flexed (**RVF**), with the external os pointing towards the anterior fornix.
- **Uterine Tenderness and Mobility:** The uterus is slightly tender when squeezed between the two hands. It is normally mobile, but might be fixed with adhesions or pelvic masses.
- **Presence of Adnexal Tenderness, Fullness, or Masses:**
  - The normal tubes are never palpable even in the very thin patient, while the normal ovaries can be felt in the thin patient, in absence of pelvic tenderness.
  - Presence of adnexal tenderness, fullness, or masses (cystic or solid), is always abnormal, and should raise suspicion for presence of pelvic pathology as; PID, ectopic pregnancy, and tubo-ovarian masses.
- **Evaluation of vaginal discharge:**
  - The amount and character of vaginal discharge, if present, are noted on the examining fingers while being withdrawn outside the vagina at the end of vaginal examination.

D. Speculum Examination:

Inspection of the cervix and vaginal walls is achieved by the aid of a vaginal speculum. The one commonly used is the self-retaining Cusco's bivalve speculum, which is inserted directly without rotation (remember that the vagina is wider from side to side than from front to back).

The cervix is inspected to detect ectopy, laceration, polyp or ulceration.



1. At the introitus

2. Inside vagina

3. Opening to view cervix

Speculum examination

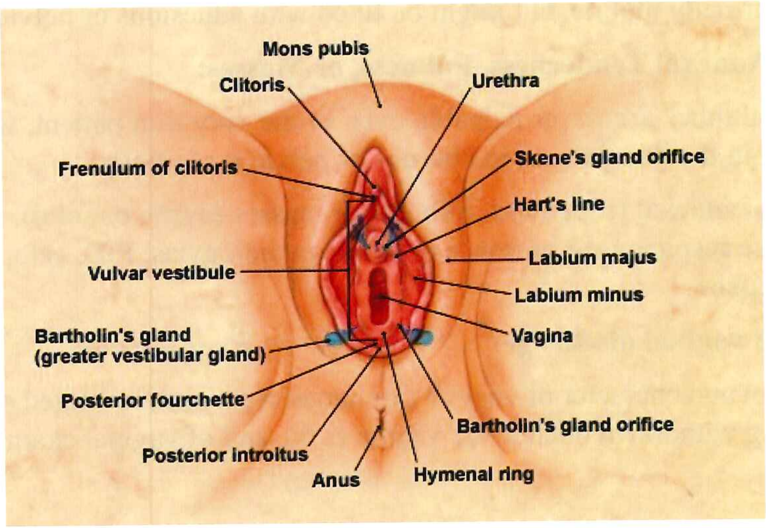
E. Rectal Examination (PR)

Rectal examination is indicated in:

1. Examination of virgins.
2. In cancer cervix; to detects extens-ion to parametrium along the uterosacral ligament.
3. In cases of prolapse: to detect presence of rectocele and exclude presence of enterocele.
4. Cases with complete perineal tears if diagnosis is not sure by inspection alone.
5. Cases with mass in Douglas pouch.
6. Cases with postmenopausal bleed-ing (piles, cancer rectum).
7. Any patient complaining of rectal symptoms.

Anatomy of the Female Genital Tract

Anatomy of the External Genitalia


Mons pubis
Clitoris
Urethra
Frenulum of clitoris
Skene's gland orifice
Hart's line
Labium majus
Vulvar vestibule
Labium minus
Bartholin's gland
(greater vestibular gland)
Vagina
Posterior fourchette
Bartholin's gland orifice
Posterior introitus
Anus
Hymenal ring

The Vulva

Mons Pubis:

The elevated fat overlying the symphysis pubis covered by skin and pubis hair.

Labia majora:

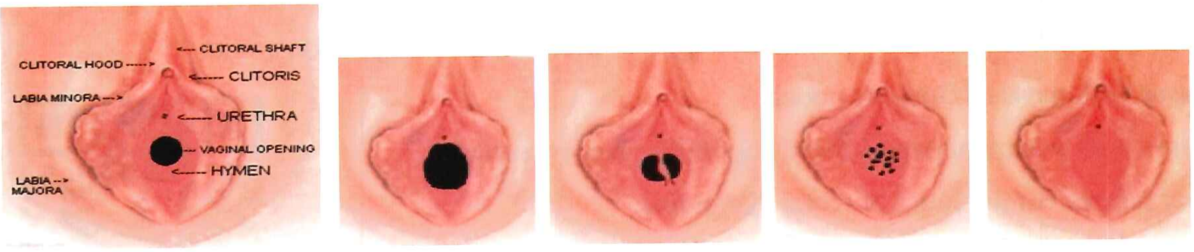
2 longitudinal folds of skin raised by fat extending from mons pubis to perineum. They are homologous to scrotum in male. They are covered by hair and contain sebaceous and sweat glands.

Labia minora:

2 thin folds of non-hairy, non-keratinized skin, internal to labia majora. Anteriorly their junction forms the prepuce and frenulum of the clitoris which is a cavernous erectile structure attracted to pubis. Posteriorly their junction forms the fourchette. A depression between hymen and fourchette is present in virgins called fossa navicularis. The area between labia minora is called vestibule. The vagina, external urethral meatus and the Bartholin duct open in the vestibule.

Hymen:

A membrane covered on both sides by stratified squamous epithelium. It lies about 2cm from the vestibule closing the vagina partially. Its opening may be annular, crescentic, bi-perforate or cribriform. Rarely the hymen is imperforate (see amenorrhea) or congenitally absent. It is torn usually in the 1st coitus. Further lacerations occur after the 1st delivery and its remnants are sessile tags called carunculae myritiformes.


CLITORAL SHAFT
CLITORAL HOOD
CLITORIS
LABIA MINORA
URETHRA
VAGINAL OPENING
HYMEN
LABIA MAJORA

Virgin *Deflorated* *Bi-perforate.* *Cribriform* Imperforate

Types of hymen

Bartholin glands:

They are bilateral small racemose glands that lie in the post. 1/3 of labia majora. It secretes mucus at time of sexual excitement. Its duct is 2cm long, lined by transitional epithelium and opens in the vestibule. The glands are not palpable unless diseased.

Blood supply of the vulva :

From internal pudendal artery, terminal branch of anterior division of internal iliac artery. Veins form plexus and accompany the corresponding arteries.

Lymphatic drainage :

See cancer vulva.

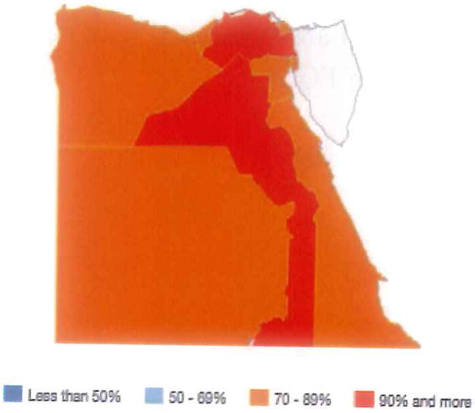
Female Genital Mutilation (FGM) in Egypt:

Female genital mutilation (FGM) comprises all procedures that involve partial or total removal of the external female genitalia, or other injury to the female genital organs for non-medical reasons.

FGM is recognized internationally as a violation of the human rights of girls and women.

FGM is still widespread. The reasons why FGM is performed is a mix of sociocultural factors within families and communities.

In Egypt, 92% of women and girls aged 15-49 have undergone some form of FGM, but increasingly condemned and criminalized.



Source: Demographic and Health Surveys 2014

Types of FGM:

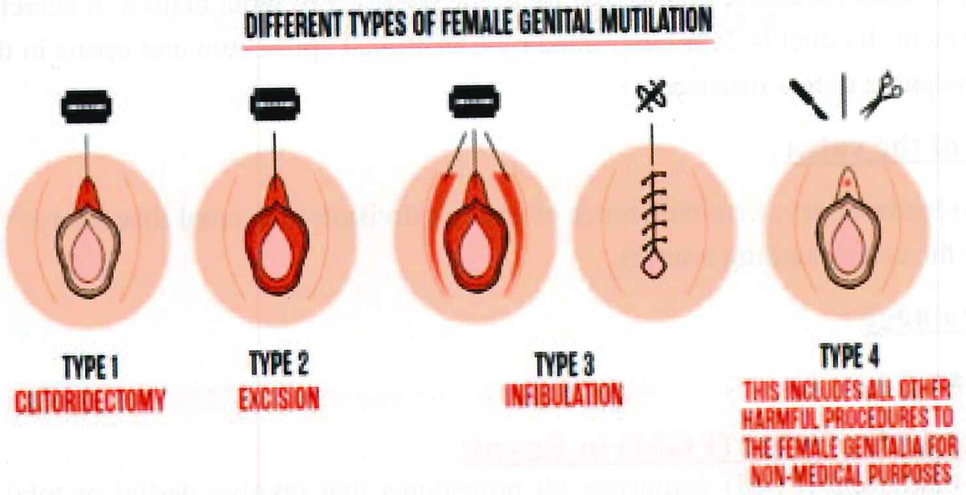
FGM is classified into 4 major types:

Type 1:
Partial or total removal of the clitoral glans and/or the prepuce/ clitoral hood.

Type 2:
Partial or total removal of the clitoral glans and the labia minora.

Type 3:
Also known as infibulation, this is the partial or total removal of the clitoris, labia minora, labia majora with closure of the raw area formed and so narrowing of the vulval opening.

Type 4:
This includes all other harmful procedures to the female genitalia for non-medical purposes, e.g. pricking, piercing, incising, scraping and cauterizing the genital area.


DIFFERENT TYPES OF FEMALE GENITAL MUTILATION
TYPE 1
CLITORIDECTOMY
TYPE 2
EXCISION
TYPE 3
INFIBULATION
TYPE 4
THIS INCLUDES ALL OTHER HARMFUL PROCEDURES TO THE FEMALE GENITALIA FOR NON-MEDICAL PURPOSES

Effects of FGM:

No health benefits, only harm

FGM has no health benefits, and it harms girls and women in many ways. It involves removing and damaging healthy and normal female genital tissue, and interferes with the natural functions of girls' and women's bodies. Although all forms of FGM are associated with increased risk of health complications, the risk is greater with more severe forms of FGM.

***Short- term complications of FGM* can include**

- Severe pain.
- Excessive bleeding (hemorrhage).
- Genital tissue swelling.
- Fever.
- Infections e.g., tetanus.
- Urinary problems.
- Wound healing problems.
- Injury to surrounding genital tissue.
- Shock.
- Death.

***Long-term complications* can include**

- Urinary problems (painful urination, urinary tract infections);
- Vaginal problems (discharge, itching, bacterial vaginosis and other infections);
- Menstrual problems (painful menstruations, difficulty in passing menstrual blood, etc.);
- Scar tissue and keloid;
- Sexual problems (pain during intercourse, decreased satisfaction, etc.);
- Increased risk of obstetric complications (difficult delivery, excessive bleeding, caesarean section, need to resuscitate the baby, etc.) and newborn deaths;
- Need for later surgeries: for example, the sealing or narrowing of the vaginal opening (Type 3) may lead to the practice of cutting open the sealed vagina later to allow for sexual intercourse and childbirth (deinfibulation).
- Psychological problems (depression, anxiety, post-traumatic stress disorder, low self-esteem, etc.)

Vagina

It is a fibro muscular canal which extends upwards and backwards from the vulva to the uterus at an angle of about 60-70 degrees to the horizontal. The cervix protrudes into the upper end of vagina.

⋆ Development:

Upper 3/4 develops from Mullerian ducts. The lower 1/4 develops from urogenital sinus (anterior part of cloaca). The upper and lower parts canalize and fuse, the separating transverse septum between them disappears.

⋆ Congenital abnormalities :

- *Aplasia :* either of the whole vagina or upper ¾ only with remaining lower vaginal pouch. Plastic surgery could be done (McIndo's operation) a split skin graft (Thiersch graft) or amniotic membrane, on a mould is put in a dissected space between the rectum and the bladder, followed by repeated dilatation for about 6 months to 1 year as retraction of graft size with narrowing of the space usually occurs.
- *Longitudinal vaginal septum:* Due to imperfect fusion of Mullerian ducts (dyspareunia may occur).
- *Transverse vaginal* septum: Due to imperfect fusion of upper ¾ and lower ¼ of the vagina. Cryptomenorrhea occurs after puberty.

⋆ Gross anatomy:

Relations:

a. *Anterior wall*: It is about 8cm long and is related to the trigone of the bladder in its upper part and the urethra in its lower part.

b. *Posterior wall*: It is about 10 cm long and is related to peritoneum of Douglas pouch in its upper part, ampulla of rectum in its middle part and the perineal body in its lower part.

c. *Lateral walls*: They are related to levator ani 2 ½ cm above the vaginal orifice, triangular ligament (urogenital diaphragm) 1cm above the orifice. The lower end on either side of the orifice is related to bulbo cavernosus muscle and Bartholin gland.

d. *Upper end*: It is divided by the cervix into anterior, posterior and 2 lateral fornices. The cardinal ligament is inserted into the lateral fornix. The ureter and uterine artery lie 1cm above the lateral fornix (water under the bridge ie: ureter below the uterine artery)

Blood supply:

Arterial supply:

- Vaginal artery.
- Branches from uterine, internal pudendal, middle and inferior rectal arteries. All arise from anterior division of internal iliac artery except inferior rectal which arises from internal pudendal.

Venous drainage: They accompany the corresponding arteries and form the vaginal plexus of veins. It connects with bladder and rectum and drains into internal iliac veins.

Lymphatic drainage:

- The upper part drains with the cervix to paracervical L.N.
- The lower part drains with the vulva to inguinal L.N.
- The middle part shares the upper and lower parts.

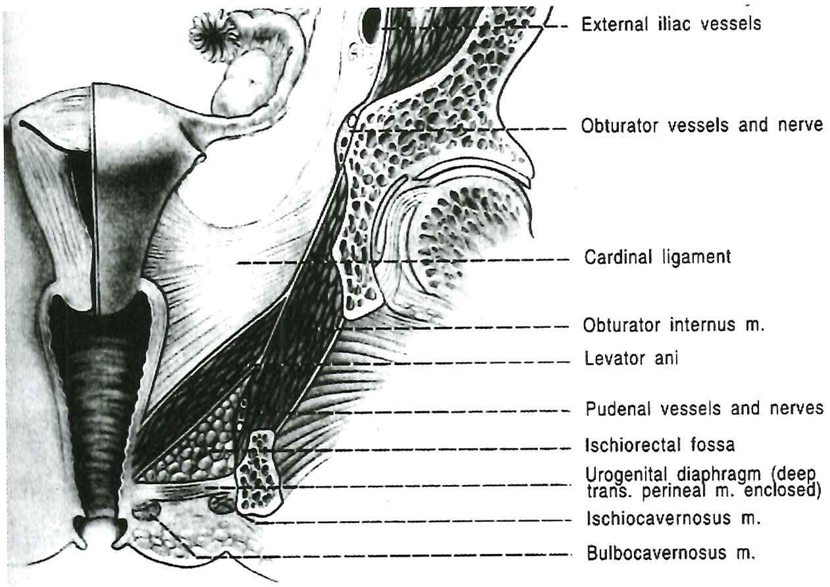
Histology:

- *Epithelial lining*: non-keratinized stratified squamous epithelial. It is elevated into folds (rugae). These rugae allow distension of the vagina.

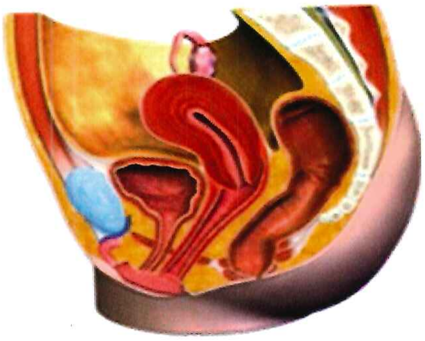
  There are no glands in the vagina but it is kept moist by a serous transudate from its wall and by cervical discharge.

Clinical application:

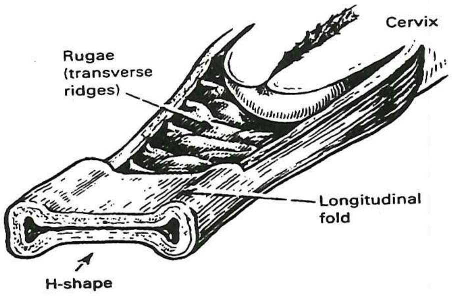
- Vaginal acidic pH: (Look infections).
- Maturation index: (Look physiology of menstruation).
- Vaginal wall prolapse e.g. cystocele and rectocele may occur due to weak fascial support of the vagina.


External iliac vessels
Obturator vessels and nerve
Cardinal ligament
Obturator internus m.
Levator ani
Pudenal vessels and nerves
Ischiorectal fossa
Urogenital diaphragm (deep trans. perineal m. enclosed)
Ischiocavernosus m.
Bulbocavernosus m.

Anatomy of the vagina



Anterior and lateral relations of the vagina
of the vagina


Cervix
Rugae (transverse ridges)
Longitudinal fold
H-shape

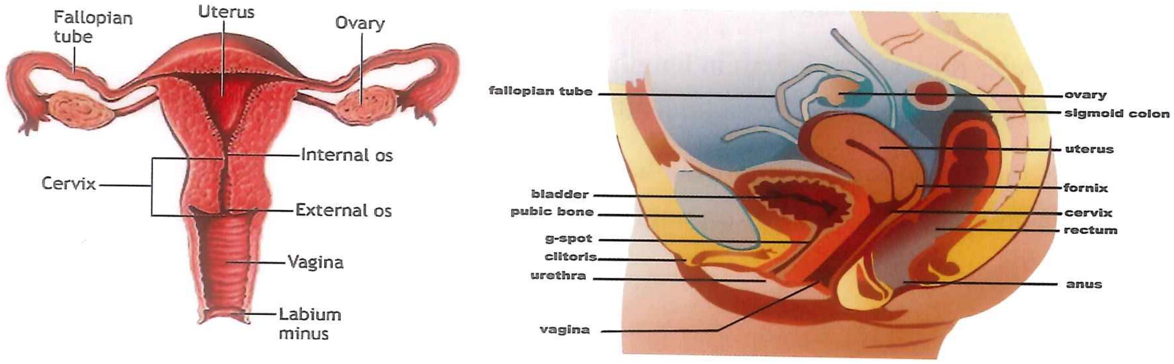
H shaped cut section

Uterus

It is a hollow flattened pear-shaped muscular organ which measures 3 × 2 × 1 inches, slightly larger in multipara. Its cavity measures about 7.5cm.

* Development:

It develops from both Mullerian ducts. They fuse in midline and canalize to form the uterine cavity.


Fallopian tube
Uterus
Ovary
Internal os
Cervix
External os
Vagina
Labium minus
fallopian tube
ovary
sigmoid colon
uterus
fornix
bladder
pubic bone
cervix
rectum
g-spot
clitoris
urethra
anus
vagina

Anatomy of the uterus

* Congenital abnormalities:

Imperfect development:

- Aplasia: (usually associated with absent upper ¾ of vagina= MRKHS: see amenorrhea).
- Hypoplasia: either rudimentary solid organ or retain infantile dimensions (cervix to body 2: 1) or pre pubertal dimensions (cervix to body 1: 1). This may present with amenorrhea, infertility or recurrent abortion.

Imperfect fusion of both Mullerian ducts:

- Uterus didelphys: 2 bodies, 2 cervices and a longitudinal septum in the vagina.
- Bicornuate uterus: 2 bodies and single cervix.
- Arcuate uterus: slight depression at fundus.
- Septate and sub septate uterus.
- Unicornuate uterus: one Mullerian duct is absent (only one fallopian tube is present).
- Rudimentary horn: one Mullerian duct is rudimentary.

These congenital anomalies may lead to infertility, recurrent abortion due to defective implantation on the fibrous septum, and may be associated with cervical isthmic incompetence. Hysteroscopic resection of uterine septum and cervical cerclage are successful in many cases.

Ectopic pregnancy may occur in a rudimentary horn.

Imperfect canalization:

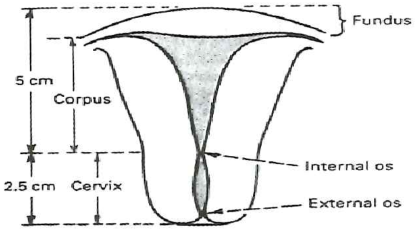
Cervical atresia with hematometra and hematosalpinx. Treatment is difficult as recurrence is very common after trials to re- fashion a cervical canal. Many cases end in hysterectomy to alleviate recurrent pain.

⋆ Gross anatomy:

The uterus is divided into body (corpus), isthmus and cervix:

- ***Body (corpus):*** It constitutes the main bulk. The area of insertion of fallopian tubes is called cornu. The part of the body above the cornu is called fundus.
- ***Isthmus:*** It is a narrow portion of about 5mm which connects the body of uterus and the cervix. It extends between anatomical internal os above to histological internal os below (the upper limit of endocervical canal).
- ***Cervix:*** It measures 2.5cm in length. It connects the uterine cavity above with the vagina below. The cervix is divided by vaginal attachment into supra-vaginal part and portio vaginalis.

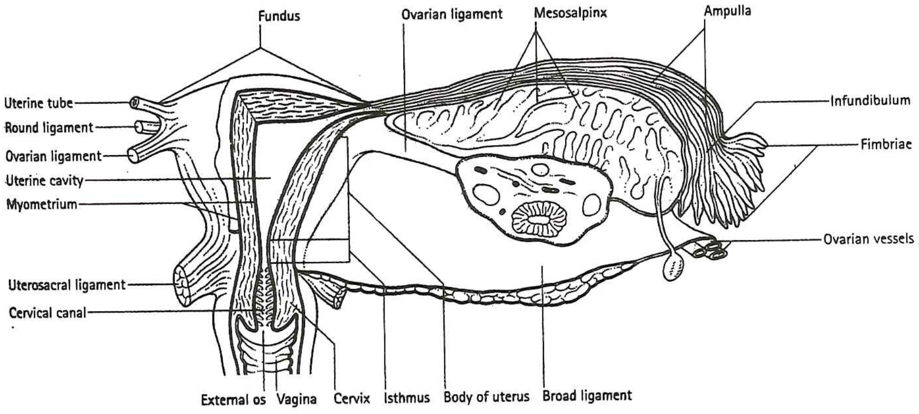
N.B.: In 85% the uterus is anteflexed (the body is bent forward on the cervix) and anteverted (the cervix makes an angle of about 90° on vagina) (AVF). In 15% the uterus is retroverted and retro flexed (RVF).


Fundus
5 cm
Corpus
Internal os
2.5 cm
Cervix
External os

Cervix to body ratio

Relations:

- *Anteriorly*: Uterovesical peritoneal reflection and urinary bladder.
- *Posteriorly*: peritoneum of Douglas pouch.
- *Laterally*: the broad ligament and its contents especially uterine artery which crosses the ureter 1cm lateral to supra vaginal cervix.


Fundus
Ovarian ligament
Mesosalpinx
Ampulla
Uterine tube
Round ligament
Ovarian ligament
Uterine cavity
Myometrium
Infundibulum
Fimbriae
Ovarian vessels
Uterosacral ligament
Cervical canal
External os
Vagina
Cervix
Isthmus
Body of uterus
Broad ligament

Lateral relations of the uterine body and cervix

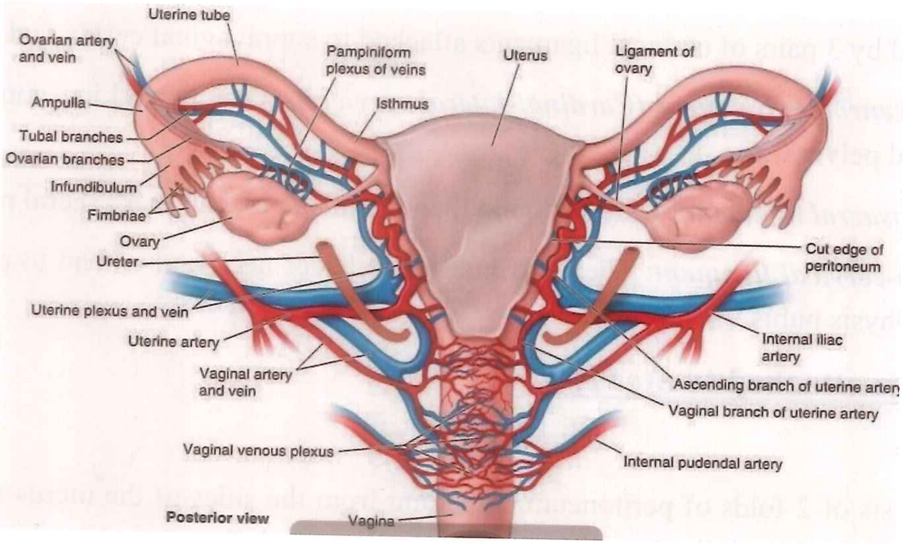
Blood supply:

Arterial supply:

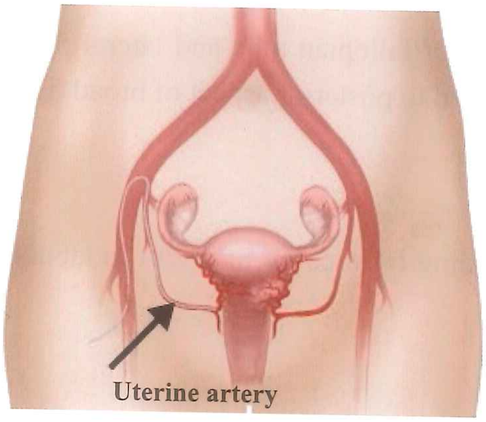
1. Uterine artery: From anterior division of internal iliac artery. The main trunk is tortuous and passes upwards parallel to the lateral border of the uterus (between the 2 layers of broad ligament) to anastomose with branches of ovarian arteries. It gives a descending branch to anastomose with ascending branches of vaginal artery and a circular branch to surround the cervix.
2. Ovarian artery: From abdominal aorta. It anastomoses with uterine artery at cornu of the uterus.

Venous drainage:

Pampiniform plexus between the 2 layers of broad ligament which drains into uterine and ovarian veins.


Uterine tube
Ovarian artery and vein
Pampiniform plexus of veins
Uterus
Ligament of ovary
Ampulla
Isthmus
Tubal branches
Ovarian branches
Infundibulum
Fimbriae
Ovary
Ureter
Cut edge of peritoneum
Uterine plexus and vein
Uterine artery
Internal iliac artery
Vaginal artery and vein
Ascending branch of uterine arter
Vaginal branch of uterine artery
Vaginal venous plexus
Internal pudendal artery
Posterior view
Vagina

Blood supply of the uterus


Uterine artery

The uterine artery

Lymphatic drainage:

Body:

- The upper part drains with the ovary to para aortic L.N.
- The lower part drains with the cervix to internal and external iliac L.N.

Cervix:

- 1ry group of L.N.: Parametrial, paracervical, obturator and internal iliac L.N.
- 2ry group of L.N.: Lateral sacral group of L.N (along uterosacral lig.) common iliac and para aortic L.N.

★ Uterine support:

The factors maintaining the uterus at its normal level with external os at level of ischial spines are:

- Lateral cervical ligaments (Mackenrodt's lig) (main support).
- Uterosacral ligaments posteriorly.
- Pelvic floor muscles.

Ligaments of the Uterus

They are condensations of pelvic cellular tissue containing few smooth muscle cells. The main support is achieved by 3 pairs of cervical ligaments attached to supravaginal cervix and upper vagina:

1. ***Mackenrodt's ligament (Cardinal-lateral cervical):*** They extend in a fan shaped manner to lateral pelvic wall.
2. ***Uterosacral ligament:*** They surround the rectum and extend to 3rd sacral piece.
3. ***Pubo-cervical ligament***: They surround the bladder neck and extend to posterior surface of symphysis pubis.

Other ligaments attached to uterus :

Broad ligament:

Each consists of 2 folds of peritoneum extending from the sides of the uterus to the lateral pelvic wall. It contains the fallopian tubes, round and cervical ligament, blood vessels, lymphatics, parametrium (loose c.t) and embryological remnants of Wolffian system.

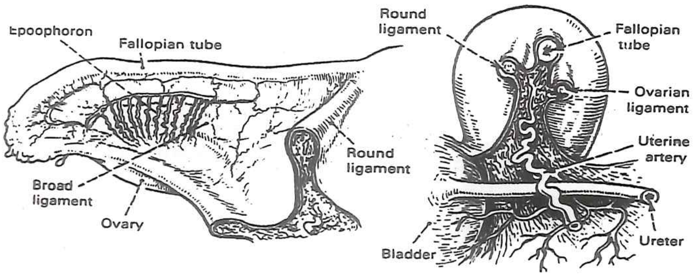
N.B. : The part between lateral end of fallopian tube and lateral pelvic wall is called infundibulo-pelvic ligament. The ovary is attached to posterior aspect of broad ligament by a fold of peritoneum called mesovarium.

Round ligament:

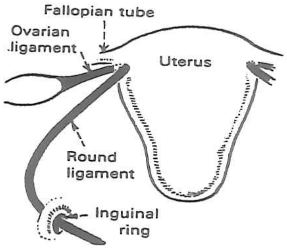
Fibro muscular bands extending form cornu of uterus to labia majora passing through the inguinal canal.

Ovarian ligament:

Short fibro muscular bands connecting the ovaries to the uterine cornu.


Epoophoron
Fallopian tube
Broad ligament
Ovary
Round ligament
Round ligament
Fallopian tube
Ovarian ligament
Uterine artery
Bladder
Ureter

The broad ligament


Fallopian tube
Ovarian ligament
Uterus
Round ligament
Inguinal ring

★ Histology of the uterus:

*A] **Body***:

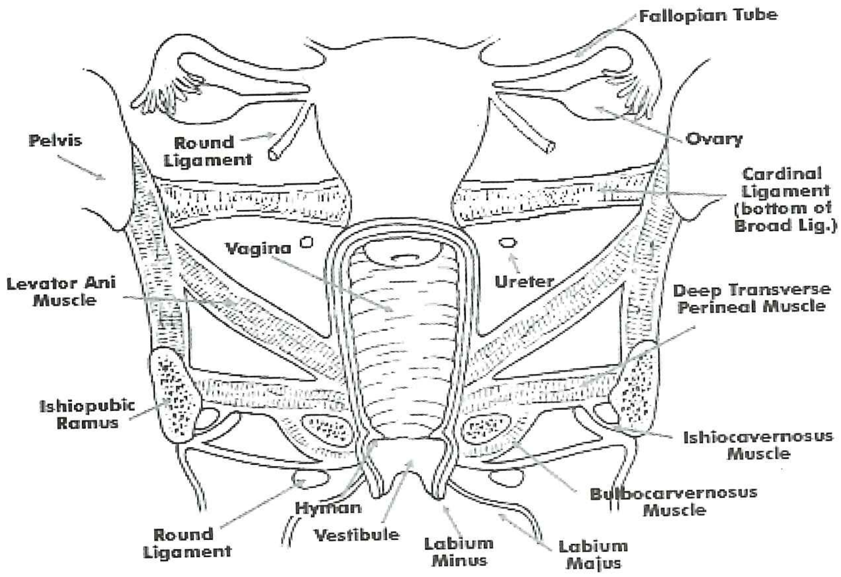
- Endometrium (mucous membrane) without submucosa.
- Myometrium: 3 layers of muscles (inner circular, outer longitudinal and middle 8 shaped fibers).
- Peritoneal coat: Firmly attached to the uterus except in the isthmus where it is loose. Anteriorly it is reflected on the bladder forming uterovesical pouch. Posteriorly it is reflected on rectum forming Douglas pouch.

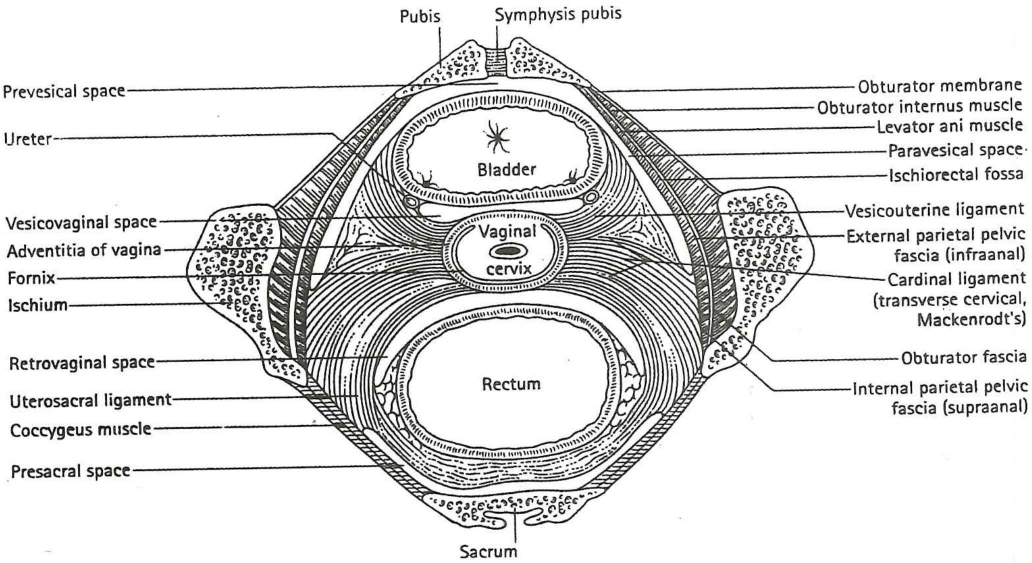
*B] **Cervix:***

It is formed of fibro muscular tissue. The ectocervix is lined by stratified squamous epithelium and the endocervix is lined by tall columnar epithelium.

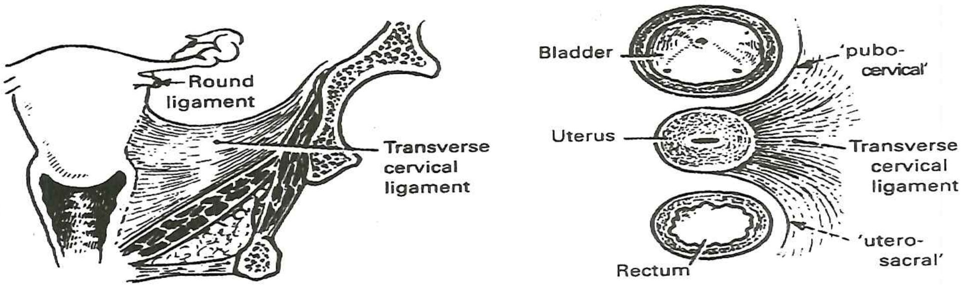
★ Clinical application:

- *Isthmus uteri*: It forms the lower uterine segment during pregnancy starting from 16 weeks to be 10cm long at full term pregnancy.
- *Uterine support*: Weak cervical ligaments lead to uterine prolapse.


Fallopian Tube
Pelvis
Round Ligament
Ovary
Cardinal Ligament (bottom of Broad Lig.)
Vagina
Ureter
Levator Ani Muscle
Deep Transverse Perineal Muscle
Ishiopubic Ramus
Ishiocavernosus Muscle
Bulbocarvernosus Muscle
Hyman
Round Ligament
Vestibule
Labium Minus
Labium Majus


Pubis
Symphysis pubis
Prevesical space
Ureter
Obturator membrane
Obturator internus muscle
Levator ani muscle
Paravesical space
Ischiorectal fossa
Bladder
Vesicovaginal space
Adventitia of vagina
Fornix
Ischium
Vaginal cervix
Vesicouterine ligament
External parietal pelvic fascia (infraanal)
Cardinal ligament (transverse cervical, Mackenrodt's)
Retrovaginal space
Uterosacral ligament
Coccygeus muscle
Presacral space
Rectum
Obturator fascia
Internal parietal pelvic fascia (supraanal)
Sacrum

The cervical ligaments


Round ligament
Transverse cervical ligament
Bladder
'pubo-cervical'
Uterus
Transverse cervical ligament
'utero-sacral'
Rectum

Attachments of the cervical ligaments

Fallopian Tubes

★ Development:

They arise from both Mullerian ducts which canalize.

★ Congenital anomalies:

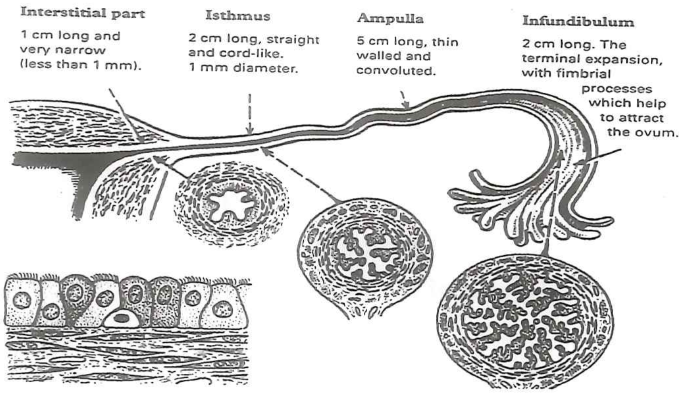
- Aplasia or hypoplasia with infertility.
- Congenital diverticulum or accessory ostium. This may predispose to ectopic pregnancy.

★ Gross anatomy:

They are 10cm long extending from the uterine cornu in the upper part of broad ligament to open into the peritoneal cavity.

Each tube is formed of 4 parts:

- *Interstitial part:* in the uterine muscle, it is about 1cm.
- *Isthmus*: narrow portion lateral to the uterus with thick muscle wall, it is about 2cm long.
- *Ampulla*: The widest part with very thin muscles, it is about 5cm long.
- *Infundibulum*: The fimbriated terminal end of the tube which opens in the peritoneal cavity. One of the fimbriae is longer than the others and lies in contact with the ovary (fimbria ovarica). These fimbriae are important for pick-up of ova


Interstitial part
1 cm long and very narrow (less than 1 mm).
Isthmus
2 cm long, straight and cord-like. 1 mm diameter.
Ampulla
5 cm long, thin walled and convoluted.
Infundibulum
2 cm long. The terminal expansion, with fimbrial processes which help to attract the ovum.

The Fallopian tube

★ Blood supply:

- ***Arterial***: Ovarian artery and uterine artery which anastomoses with each other.
- ***Venous***: Along the corresponding arteries.

★ Lymphatic drainage:

- They drain into para aortic and pelvic L.N.

★ Histology:

- Serous coat: formed by upper margin of broad ligament.
- Muscular wall: inner circular and outer longitudinal.

- Mucus membrane (endosalpinx): single layer of low columnar epithelium (ciliated and non-ciliated).

★ Clinical application:

- *Function of the tube:* it has a highly complicated peristaltic movement allowing paradoxical movement pushing the ova towards the uterine end and the sperms to the opposite direction.
- *Salpingitis:* due to its double blood supply, the tube is never to be gangrenous in acute salpingitis.

The Ovaries

★ Development:

- They start to differentiate in about the 5th week. They develop from the genital ridge at level of 10 – 11 dorsal segments.
- A fibro muscular band (gubernaculum) attaches the lower pole of the ovary to inguinal region. Later on the gubernaculum is attached to the uterus. The part between the ovary and uterus becomes the ovarian ligament and the rest is changed to the round ligament.
- Descent of the ovary is due to traction by gubernaculum and unequal growth of fetal body.

★ Congenital anomalies :

- Aplasia on one or both sides (very rare).
- Turner syndrome (dysgenesis): 45XO with streak gonads.
- Accessory ovary may be present.

★ Gross anatomy:

They are 2 almond shaped bodies measuring 3 × 2 × 1cm. They are attached to the cornu of uterus by ovarian ligament, to the lateral pelvic wall by infundibulo- pelvic ligament and to the posterior aspect of broad ligament by mesovarium. The fimbrial end of the fallopian tube especially fimbria ovarica surrounds the ovary.

The exact position of the ovary is variable, sometimes it lies near the pelvic brim in a depression called ovarian fossa (in front of ureter and internal iliac vessels). In some cases, it lies in Douglas pouch.

★ Blood supply:

- ***Arterial:*** Ovarian artery and anastomotic branch of uterine artery.
- ***Venous:*** It drains into pampiniform plexus in broad ligament and then to ovarian veins. The Rt vein ends in inferior vena cava but Lt vein drains into Lt renal vein.

★ Lymphatic drainage:

It drains directly into para-aortic L.N. Additional pathway with the uterus drains into external and internal iliac L.N.

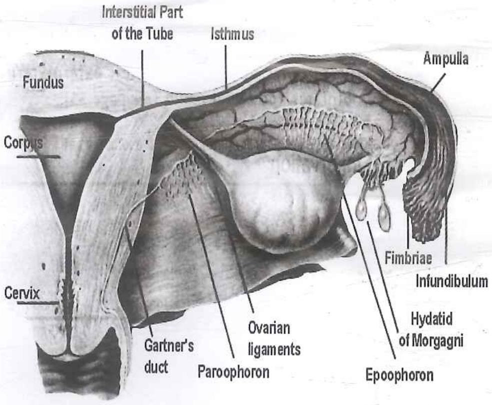
★ Histology:

The ovary is divided into 3 regions:

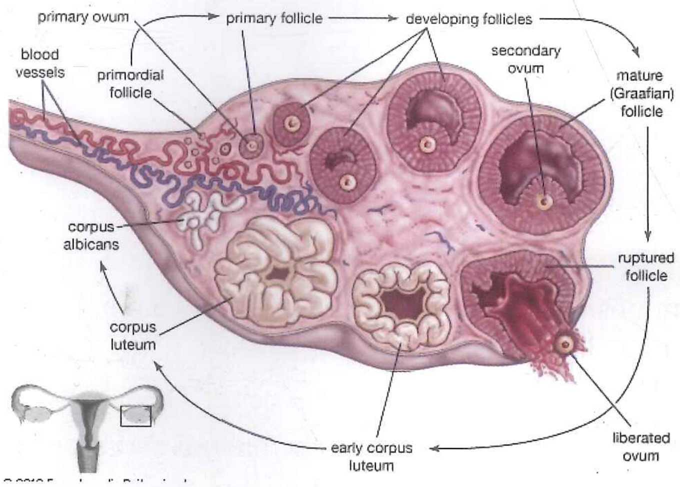
- ***The hilum:*** area of attachment to mesovarium through which blood vessels and nerves enter and leave the ovary.
- ***The medulla:*** consists of C.T enclosed by the cortex.
- ***The cortex:*** dense C.T. stroma in which scattered Graafian follicles in various stages of development are present. The ovary is surrounded by tunica albuginea which is a dense C.T layer covered by a single layer of incomplete cubical cells (germinal epith.).
- The ovary is not surrounded by visceral peritoneum.

★ Clinical application:

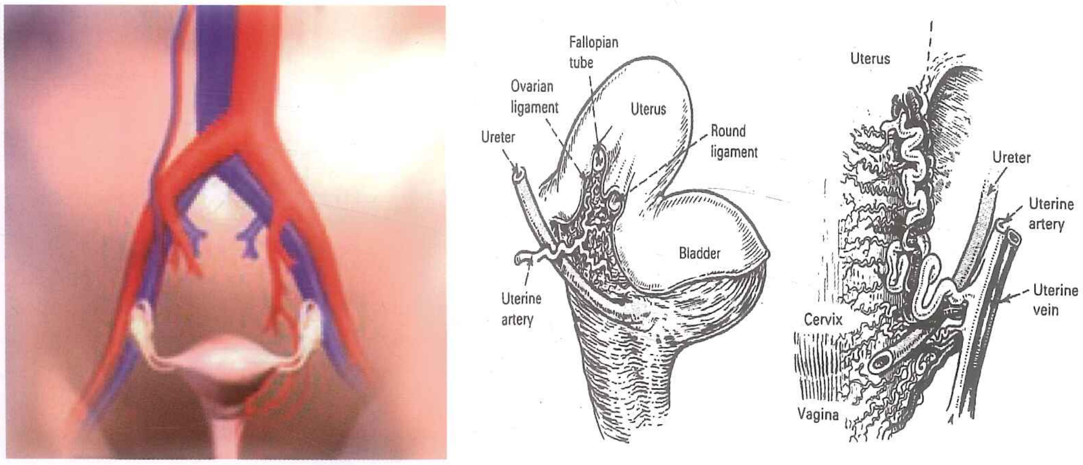
- Epithelial ovarian tumors may arise from the epithelial lining of the ovary.
- Deep dyspareunia may occur if the ovaries are prolapsed in Douglas pouch as they are sensitive to touch.


Interstitial Part of the Tube
Isthmus
Ampulla
Fundus
Corpus
Cervix
Fimbriae
Infundibulum
Hydatid of Morgagni
Gartner's duct
Ovarian ligaments
Paroophoron
Epoophoron

Attachments of the ovary


primary ovum
primary follicle
developing follicles
blood vessels
primordial follicle
secondary ovum
mature (Graafian) follicle
corpus albicans
ruptured follicle
corpus luteum
liberated ovum
early corpus luteum

Histology of the ovary



Blood supply of the ovary

Pelvic Floor

It is formed by the soft structures which fill the bony outlet of the pelvis. It consists of the following structures from above downwards:

- **Pelvic peritoneum.**
- **Pelvic cellular tissue (pelvic fascia):** It fills the spaces between pelvic organs and between layers of broad ligaments. This fascia is abundant around the cervix and is called parametrium. Cervical ligaments are condensations of the pelvic cellular tissue containing few smooth muscle cells (enumerate).
- **Levator ani muscles:** the main constituent of pelvic floor (pelvic diaphragm) (see later).
- **Perineal muscles** which include transverse perineal muscles (superficial and deep), bulbo-cavernosus, ischio-cavernosus and external anal sphincter
- **Perineal skin and fascia.**

N.B. : Levator ani muscle :

It is composed of 3 parts:

a. ***Pubo-coccygeus:*** arises from posterior aspect of pubic bone. Its medial fibers pass backwards on either side of the vagina to decussate in the apex of perineal body. Lateral fibers unite with those of opposite side behind the rectum reaching the coccyx. This results in 2 opening in the pelvic diaphragm: rectal hiatus through which passes the rectum and urogenital hiatus through which pass the vagina and urethra.

b. ***Iliococcygeus*** : Arises from the white line on obturator internus m. and is inserted into coccyx and ano-coccygeal raphe.

c. ***Ischio coccygeus:*** from tip of ischial spines to coccyx.

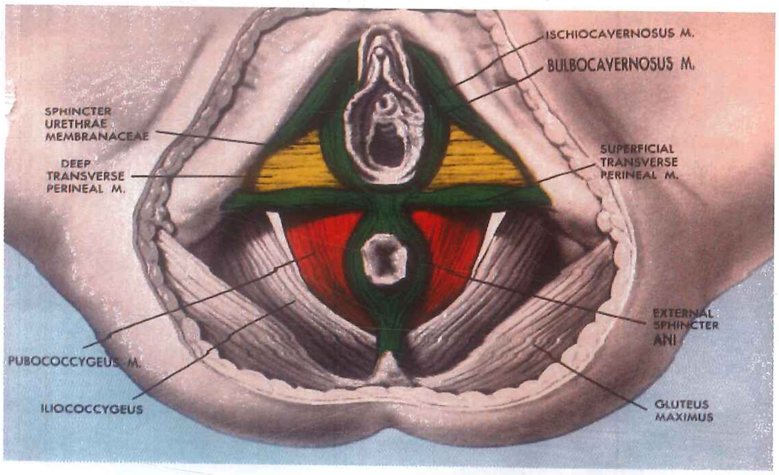
★ **Functions**:

- Supportive to pelvic viscera (pelvic diaphragm).

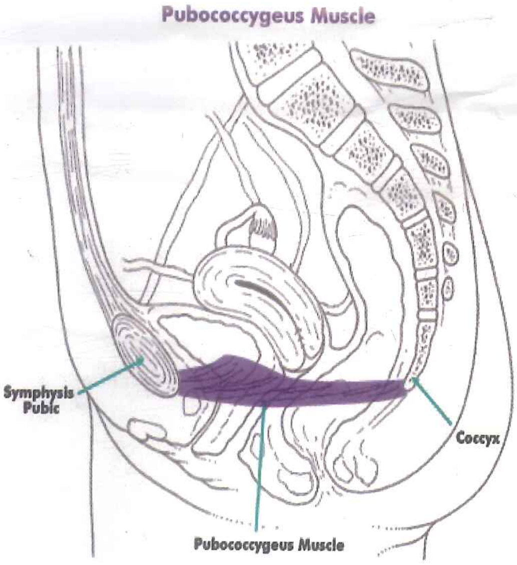
- Sphincter to vagina, bladder neck and rectum. Also it helps in the act of defecation.
- Important for internal rotation during labor.

★ **Clinical applications** :

- Injury to pelvic floor leads to genital prolapse and stress incontinence.
- Too rigid or too lax pelvic floor may interfere with internal rotation during labor.


ISCHIOCAVERNOSUS M.
BULBOCAVERNOSUS M.
SPHINCTER URETHRAE MEMBRANACEAE
DEEP TRANSVERSE PERINEAL M.
SUPERFICIAL TRANSVERSE PERINEAL M.
EXTERNAL SPHINCTER ANI
PUBOCOCCYGEUS M.
ILIOCOCCYGEUS
GLUTEUS MAXIMUS

Levators ani muscles


Pubococcygeus Muscle
Symphysis Pubic
Coccyx
Pubococcygeus Muscle

Pelvic part of ureter

⋆ Gross anatomy :

The ureter on each side enters the female pelvis by crossing the pelvic brim in front of bifurcation of the common iliac artery and forms the posterior boundary of ovarian fossa (behind ovarian vessels). The ureter then turns downwards into the pelvis lying in front of internal iliac artery. At level of ischial spines, it runs medially and forwards through the parametrium at the base of the broad ligament. It lies 1cm lateral to supravaginal cervix where it is crossed by uterine artery. The ureter then passes along the ureteric canal (in Mackenrodt's lig) to enter the trigone of the bladder.

⋆ Blood supply :

Internal iliac, uterine, vaginal and inferior vesical vessels.

⋆ Clinical applications :

- Liable sites for injury of ureter: during ligation of uterine arteries/ during ligation of the infundibulo-pelvic arteries/ at the vaginal angles.
- Measures to prevent injury: proper visualization and identification of the ureters during the surgical procedure. (See genito-urinary fistula).

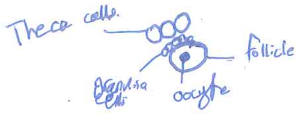
مهم جدا Physiology of Menstruation

[I] Cyclic Changes in the Ovary

- At the age of puberty, the hypothalamus (governed by higher centers in C.N.S.) starts to produce gonadotropin releasing hormones (GnRH) which are decapeptides in a pulsatile fashion. → Pulses يتفرز كل كذا short half life.
- GnRH reaches the ant. pituitary through the hypothalamo-hypophyseal (Pituitary) portal (small) circulation. They stimulate basophilic gonadotroph cells to secrete gonadotropin hormones (glycoprotein). These hormones are follicle stimulating hormone (F.S.H.) and Luteinizing hormone (L.H.). The dominant type produced by the pituitary depends on frequency and amplitude of GnRH pulse.
- F.S.H. and L.H. stimulate ovarian steroidogenesis and control the changes of menstrual cycle as follows :

I- In the 1st half of the cycle (follicular phase):

The ant. pituitary secretes mainly F.S.H and small amounts of L.H.



ال follicle حواليها طبقات ال follicle two layers ووجود ال Oocytes

Functions of F.S.H.:

1. *Growth of the follicles :*

at time of Puberty عدد ال oocytes fixed 300.000 in both ovaries.

- At puberty the ovarian cortex contains large number of primordial follicles (about 300.000). Each one consists of an ovum with uncompleted maturation division surrounded by one layer of flattened cells (pre antral follicle). F.S.H. stimulates several primordial follicles to grow (about 10-20). The flattened cells start to multiply giving rise to many layers of cuboidal granulosa cells around the ovum.

بس مش كلهم حتى يصير لهم ovulation اليوصل to mature يعني يصير لها ovulation والباقي اللي ما يقدر يصل to maturity يصير لها atresia. وبالتالي هنا 300 chance أو بمعنى تاني 300 شهر ليحصل كل 1000 واحدة تعيش والباقي يموت.

- A cavity filled with follicular fluid is formed inside the granulosa cells (antrum) and the ovum -surrounded by a layer of granulosa cells- is pushed to one side. The ovarian stroma cells increase in size and vascularity to become theca interna. External to this layer is the theca externa which is formed of condensed stroma cells.

oocytes أقرب لل ← for protection of nucleous.

- At this stage of development the follicle is termed mature Graafian follicle. During each cycle usually one follicle only (the dominant follicle) reaches maturity and the rest become atretic. → يصير لهم atresia

2. F.S.H. stimulates, granulosa cells to produce estrogen (steroid) (mainly estradiol E_2). Estrogen also increases F.S.H. receptors in granulosa cells (increases its sensitivity).
3. F.S.H. and estrogen stimulate aromatase enzyme in the follicle which changes androgen (androstenedione) to estrogen leading to high estrogen environment in the dominant follicle. ← ويصير release in ovarian circulation vessels.

يأخذ ال theca cells ال cholestrol تحوله ل androgen وتحوله ل Blood ال ال aromatase enzyme تحوله لاستروجين.

4. Late in this phase F.S.H and estrogen help in the formation of L.H. receptors in granulosa cells (for subsequent progesterone production). ويتحكموا يعني

بنقيس LH و FSH من 2-5 standarized

normally FSH تلاقي ال أعلى

Period من نزول ال يعني اليوم ماهو Reading ال أول يوم

Function of small amounts of L.H.:

It stimulates theca interna cells to produce androgen (mainly androstenedione) which is changed by aromatase enzyme to estrogen.

أرقام ال FSH, LH ما تزيد عن 10

Selection of the dominant follicle is achieved by :

- Small follicles will contain less aromatase enzyme; androstenedione will accumulate inside them leading to atresia.

small follicles
↓
less aromatase enzyme
↓
accumulation of androstenedione
↓
atresia.

- Increasing E_2 secretion from granulose cells will lead to –ve feedback on hypothalamus and pituitary with decreased F.S.H. level. Also, a peptide called **inhibin** is produced by proliferating granulose leads to suppression of F.S.H.
- Decreased F.S.H. level will affect growth of small follicles but the dominant follicle continue to grow.

II. In the middle of the cycle (ovulatory phase):

relasing of oocytes whether fertilization يحصل ولا لا

the only Positive feedback

Twelve to 24 hours before ovulation, persistent high E_2 level causes +ve feedback mechanism on hypothalamus and pituitary to produce high level of LH (LH surge or LH peak).

14

▣ ***Functions of LH surge***: (triggers ovulation) الـ LH surge هو الي حيخلي البويضة تفرقع

1. This is needed to complete maturation of the dominant follicle and increasing LH receptors.
2. L.H. stimulates theca cells to produce androgens to complete atrophy of atretic follicles and to increase sexual desire at time of ovulation.
3. L.H. stimulates completion of reduction division of the ovum and stimulates prostaglandin release (PG F_2□ - PGE_2) and proteolytic enzymes which are responsible for the physical act of ovulation (extrusion of the ovum surrounded by a layer of granulosa cells called corona radiata from the follicle to the peritoneal cavity).

steroid

III. In the 2nd half of the cycle (luteal phase) :

follicle = oocyte

remenents of granulosa and theca cells

هادي وهي mature 20 mm يعني 2 cm

1. The Graafian follicle after rupture is transformed into corpus luteum (C.L.). The granulosa cells proliferate, becomes vascularized and acquire yellow color (probably because of carotene, cholesterol and phospholipid deposition in cells).

من نوق الـ Period يعني وجود الـProgesterone معتمد على وجود الـ LH

الـ Grafian follicle ممكن تكون two fetes
sperm
Fetus Corpus lutem.

2. The corpus luteum produces mainly progesterone (which reaches a peak at about day 21) in the 2nd half of the cycle for about 12 – 14 days and is maintained by LH.

بس كان تفرز الـ C.L الـProgesterone يستمر ١٤ ovulation بعد الـ

3. High levels of estrogen and progesterone inhibit the hypothalamic releasing hormones with decreased F.S.H. and L.H. levels. This causes degeneration of corpus luteum. Prostaglandin production by C.L may be responsible for final degenerative changes.

negative feedback

تتحول Corpus albicans

لو لقيت انه Progesteone 3 أعلى من 5ng/ml نقول انه الـ cycle دي ovulatory

4. Degeneration of C.L results in decreased estrogen and progesterone secretion with resultant menstruation and a new cycle will start.

بالتالي يعلى الـ LH و FSH وتبدأ cycle تانية

الـ ovulation يحصل كل اليوم الـ ١٤ حيبقى اضافا لحد ٧ نقيس الـProgesterone ينتهى الـ luteal phase اي هو ١٥ يعني تانية الـpeak يعني اليوم ٢١

5. If pregnancy occurred chorionic gonadotropins will be secreted by the chorionic villi (having LH action). This will maintain corpus luteum till the end of 1st trimester when placental hormone production is settled.

3 شهور

[II] Cyclic changes in the Endometrium

A) Proliferative phase: first half of the cycle in endometrum.

- ➢ Starts after menstruation and ends with ovulation. Its duration is variable according to length of cycle (average length of cycle is 28 days but it may vary from 21 to 35 days). In the cycle of an average length its duration is from 9-11 days.
- ➢ It is under effect of estrogen produced by the growing follicles.
- ➢ Regeneration of the surface epithelium occurs from the basal portion of the glands and the endometrium gradually increases in thickness. The glands are simple, tubular, and perpendicular to the surface and

Proliferation of uterus glands

lined by columnar epithelium. Stroma cells increases gradually with little cytoplasm and vascularity increases.

B) Secretory phase:

second half of the endometrial cycle

Gland fulled with secretions under the effect of Progesterone

- Starts with ovulation and ends at onset of menstruation. Its duration is fixed in normal cycles i.e. about 14 days whatever the length of the cycle.
- It is under the effect of progesterone produced by the corpus luteum.

بيصير secretory endometrium عشان تقدر تغذي ال fertilized ovum

- The glands becomes tortuous (cork screw) and filled with secretions. Stroma becomes edematous with more cytoplasm.
- The endometrium can be differentiated into 3 layers: superficial compact layer around the neck of the glands, intermediate spongy layer around the distended lumens and deep basal layer around basal parts of the glands.
- 2-3 days before menstruation, leucocytic infiltration appears in the stroma. If pregnancy occurred the secretory changes become more marked and the endometrium is transformed into decidua of pregnancy.

وتتحول لـ [illegible]

C) Menstrual phase: (Menses)

- ***Definition***: The periodic and cyclic shedding of the superficial and intermediate layers of the endometrium.
- ***Amount:*** Average 50 to 100c.c. ml
- ***Duration:*** 2-7 days are average.

ملاحظة مهمة: ال progesterone لكون موجود بال 2nd half of ovulatory cycles not all cycles.

ملاحظة: ال menstrual cycle دورتها الطبيعية 28 ± 7 days

- ***Composition:*** Blood mixed with mucus, endometrial shreds, desquamated vaginal epithelium and leucocytes.
- ***Character of blood:*** Dark red blood which does not clot. The blood at first clots in the uterine cavity but the clot dissolves due to fibrinolytic enzymes produced by endometrium (menstrual blood is deficient in fibrinogen and prothrombin). If the amount of menstrual blood is excessive, the amount of fibrinolysins will be insufficient and clots are formed. It has a specific odor due to decomposition of blood and sebaceous secretions of the vulva. ?
- ***Associated PMS symptoms:*** headache, depression, lower abdominal pain, backache, nausea and the breasts are slightly enlarged and painful.
- ***Mechanism of menstruation:***

ليه ال estrogen وال Progesterone كانوا عاملين maintance to glands of uterus

  - Due to drop of estrogen and progesterone levels (after C.L. degeneration) the endometrium shrinks, so the spiral arterioles increase their coils with resultant ischemic necrosis of the superficial layers of the endometrium with subsequent shedding. The degenerated layers release prostaglandins that cause spasm of the stem arterioles and uterine contractions. This helps to limit amount of blood loss.
  - The basal layer is not involved because it is supplied by the straight short arterioles.

تقلصات ال uterine cramps contractions

تأكد In curatge - this layer should not be removed / menses بتحصل [illegible] menopause

لو شلتها بيبقى مفيش ovulation [illegible]

source of ال regeneration of glands

endometrium three layers

superficial

intermediate

basal layer

(ال basal layer doesn't shed)

[III] Cyclic Changes in the Cervix

- The cervix does not share in menstrual shedding:
- In 1st half of cycle: E. effect i.e. profuse, less viscous, +ve Spinbarkeit, +ve ferning with occasional cellularity.

watery

Excessive with no WBC

secretions mucus stretching

ال cramps [illegible] Ovulatory cycle Prostaglandin

anti-Prostaglandin (NSAID)

Oral contraceptive

Cervix function: watery secretions with no leucocytes

وظيفتها تساعد ال sperms

ال uterus وظيفته الوحيدة هو وعاء لـ Baby

No nutrications leucocytes [illegible]

Telegram: @[illegible]bot

- In 2nd half of cycle: P. effect i.e. less profuse, more viscous, -ve Spinbarkeit, -ve ferning with increased cellularity. WBC كثير [illegible]

sperm [illegible] infection [illegible]

ratio basal intermediate superficial

maturation index scarb cytology [illegible]

[IV] Cyclic Changes in the Vagina

estrogen

- *In 1st half of cycle*: E. effect with increased superficial cells. Maturation index is 0, 30, 70.

progesterone

- *In 2nd half of cycle*: P. effect with increased intermediate cells. Maturation index is 0, 70, 30.

secretion [illegible]

scrab [illegible] vagina

No basal layer

Vagina lined by non-keratinized stratified squamous epithelium. epithelium [illegible]

Dysmenorrhea

Definition:

It is pain related to menstruation (Just before or during menstruation).

Types:

A) Spasmodic dysmenorrhea: (1ry dysmenorrhea)

Lower abdominal colicky pain which starts on the 1st day of menstruation and then it diminishes gradually. It may be referred to lower limbs and may be associated with nausea and vomiting.

The pain usually appears 2-3 years after puberty **(It Occurs Only In ovulator Cycles)** as the initial cycles after puberty are usually of life and is greatly improved after childbirth.

Etiology

The pain is of uterine origin. Several theories are present, most accepted: Excess release of prostaglandins by the endometrium. $PGF2\alpha$ increases uterine contractility and is vasoconstrictor. PGE_2 increases the sensitivity of nerve endings. Prostaglandins are also responsible for nausea and vomiting due to contractions of gut musculature.

Treatment :

➲ ***General ttt*** :

Reassure the patient (spasmodic dysmenorrhea suggests ovulation), avoid sedentary life (some exercises will improve the patient & redirect her attention away from feeling pain).

➲ ***Medical ttt*** :

- Antiprostaglandins as mefenamic acid (it decreases synthesis of PG and opposes its action in peripheral tissues).

➲ ***Hormonal ttt*** :

- Combined estrogen and progestagens (e.g. oral contraceptive pills) could be used to inhibit ovulation.

B) Congestive dysmenorrhea: (2ry dysmenorrhea)

Lower abdominal dull aching pain accompanied with backache which starts few days (3-5 days) before menstruation, increases gradually as menstruation approaches and is relieved by its onset. The pain usually appears after many years of relatively painless menstruation.

Etiology :

Pelvic congestion secondary to a pelvic pathology e.g.:

- Simple congestion in constipation & coitus interruptus.
- Chronic cervicitis and salpingitis.
- Prolapse, Fibroid.
- Endometriosis.

N.B. : In endometriosis, there is a special type of dysmenorrhea which starts premenstrual and increases at onset of menstruation due to distention of ectopic endometrium with blood and gradually diminishes after the end of menstruation (Crescendo-decrescendo dysmenorrhea).

Treatment :

- ttt of the cause.
- Avoid constipation and sedentary life.
- Glycerine icthyol vaginal perssaries to diminish pelvic congestion.

Premenstrual Tension Syndrome (P.M.S.)

Definition:

It refers to diverse symptoms which recur cyclical monthly just before onset of menstruation and is relieved by its onset. These symptoms may be headache, irritability, depression, mastalgia, bloating sensation.

N.B. : Dysmenorrhea is considered a separate entity and is not involved in this syndrome.

Etiology:

Disease of theories, most accepted is progesterone (released as a result of ovulation) causes salt and water retention.

Treatment:

It is usually directed towards the most presenting symptom (Symptom chart could be used every month to detected the most prominent problem) e.g. :

- Reduce salt intake in premenstrual period and some diuretics could be given in cases with edema and bloating sensation.
- Calcium, VitD, Vit B_6 may benefit some patients.
- Selective serotonin reuptake inhibitors, demonstrated effectiveness in treating both physical and mood symptoms.
- COCPs (combined oral contraceptive pills) will inhibit the ovulation and so prevent the occurrence of PMS.

Puberty

Definition:

It is the period of life during which physical growth and maturation of sexual organs start to occur.

Mechanism:

During childhood the hypothalamus is very sensitive to –ve feedback by estrogen. This prevents rise in estrogen to the level which causes maturation. At puberty, there is decreased C.N.S sensitivity to this inhibition. This allows estrogen levels to rise causing puberty. Also a central factor may be responsible with increased pulsatile secretions of hypothalamic GnRH. This will increase secretion of pituitary gonadotropins (FSH and LH) which lead to growth of ovarian follicles and ovarian hormones synthesis.

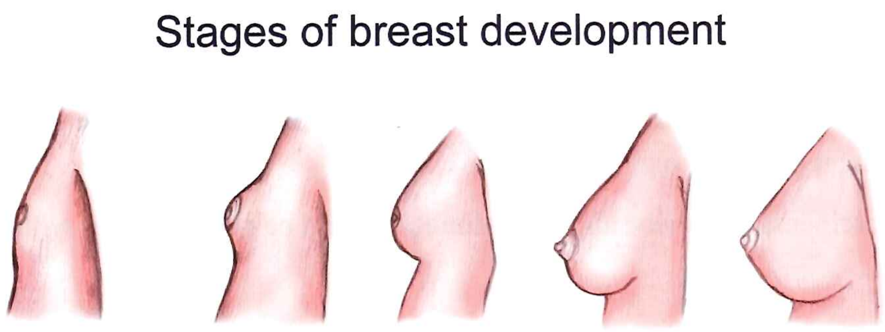
Factors determining age of puberty:

- Genetic sex and familial factors.
- Geographic factors.
- General health, body weight & nutrition.
- Psychologic factors.

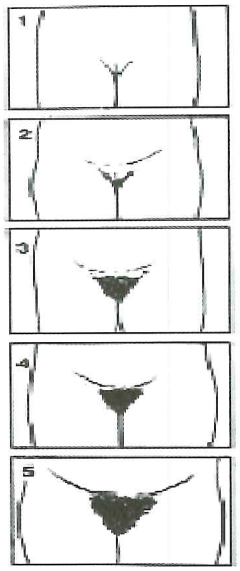
Stages of puberty:

a. Acceleration of growth due to increased growth hormone.
b. Breast budding (Thelarche) due to E effect.
c. Appearance of pubic (Pubarche)
d. Menarche (the age of 1st menstruation). It occurs at about 12.5 years.
e. Appearance of axillary hair (Adrenache), due to increased ACTH and adrenal function.

Tanner had classified puberty into 5 stages depending on degree of breast development and distribution of pubic hair.



Tanner Stages of the Breast



Tanner stages of pubic hair

Abnormalities in Puberty:

***I. Precocious puberty*:** Pubertal changes before age of 8 years.

Causes:

- *True precocious puberty:* the mature ovaries are the source of E.hormone, e.g., constitutional (more common) or CNS lesion (infection or neoplasm).

- *Pseudo-precocious puberty:* there is exogenous source of E. eg., ovarian or adrenal tumours or due to drug intake.

N.B. : Heterosexual precocious puberty : mainly due to vilirizing adrenal and ovarian tumors

Diagnosis of precocious puberty :

➢ ***History and ex.*** :

-Family history of similar conditions, heterosexual or isolated.

-Evaluate type of puberty e.g iso-sexual. Tanner stage is used to evaluate the cases.

➢ ***Hormone assay*** :

-FSH, LH, E2.

-Thyroid functions & prolactin (2^{ry} hypothyroidism is associated with increased TRH, prolactin, GnRH & may cause precocious puberty).

➢ ***Imaging procedures*** :

-Pelvic U.S to detect any ovarian neoplasm.

-CT, MRI to detect brain lesions.

Treatment of precocious puberty :

- Treatment of the cause as removal of any causing tumor, treatment of thyroid dysfunction or CN.S lesion.
- Constitutional type : GnRH agonists could be given for some patients to suppress estrogen production. This prevents the premature closure of epiphysis and short stature.

II. Delayed puberty: (see 1ry amenorrhea).

Amenorrhea

Definition:

Absent mensturation, it is classified into :

أول حاجة نسأل عليها هنا عندها كام سنة؟

- *1ry amenorrhea* (Pathological) *(very rare < 0.1%)*: failure of menstruation by the age of 14 years without development of 2ry sex characters or by the age of 16 years even in presence of normal development.
- *2ry amenorrhea (most common type)* : Cessation of mentruation for 3 successive cycles or 6 months in absence of physiological causes.

14 years with presence of sexual characters: Reassurance

Etiology: It is classified to :

- *Physiological causes* : 1 before puberty, 2 after menopause, 3 during pregnancy and variable period during 4 lactation.
- *Pathological causes* : Due to outflow disorders (uterus & vagina) or disorders of hypothalamo-pituitary ovarian axis.

[I] Outflow disorders :

(1) Cryptomenorrhea (false amenorrhea):

- **Definition**: Menstruation occurs but escape of blood is prevented by obstruction.
- **Etiology**: Congenital imperforate hymen (more common) or transverse vaginal septum (less common) or rarely cervical atresia.
- **Pathology**: blood collects above the level of obstruction. Hematocolpos (vagina), hematometra (uterus) usually occurs & in neglected cases, hematosalpinx (fallopian tube), pelvic endometriosis with marked pelvic adhesions.
- **Clinical picture**:

▣ *Symptoms*: It presents in young age (few months after expected age of menarche) by cyclic lower abdominal pain which could be acute & recurs every month in absence of menstrual flow. Urine retention may occur due to stretch & kink of urethera by the haematocolpos.

cyclic lower abdominal pain

حصلها تكرش

abdominal enlargement simulating pregnancy

▣ *Signs*:

- **Generally:** Well developed 2ry sex characters according to age.
- **Abdominally:** uterus could be felt as pelvi abdominal swelling.
- **Locally:** bluish bulge of hymen appears from the vulva in cases of imperforate hymen. It is not present in higher obstruction as vaginal septum.
- **Rectal ex. (PR):** Will detect level of obstruction & can feel hematocolpos.

▣ *Specific investigations*: Abdominal or trans rectal ultrasound to detect level of blood collection. Check for other anomalies especially renal.

- **Treatment:** Cruciate incision of hymen to allow slow evacuation of blood is easily done or excision of vaginal septum. This should be done as early as possible to prevent pelvic adhesions.

small incision in hymen to mimic the normal opening of the hymen.

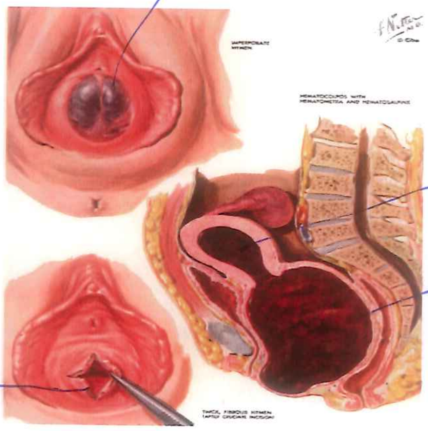
imperforate hymen ازاي افرق ال
transverse vaginal septum. و ال
examination of external genitalia بال
تلاقي opening ال intact hymen ولا septum ال

ملهاش أي opening
ال hymen موجود

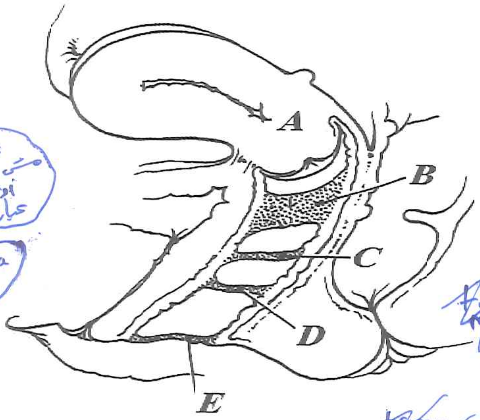
[illegible] different [illegible]
management:
(i) Hysterectomy (keeping ovaries in place)

local examination: PR
virgin لانها

Cervical atresia: ? failure of canalization of cervix.
No hematocolpos here



Imperforate hymen with haematocolpos & haematometra



Transverse vaginal septum site from above downwards

~~canalization septum~~
~~mullerian duct~~
~~urogenital sinus~~
~~transverse vaginal septum~~

symptoms
symptoms
cryptomenorrhea
hematocolpos
hematometra
hematosalpinx

Managements
total excision of the transverse vaginal septum.

(2) Mullerian agenesis (Mayer-Rokitansky-Kuster-Hauser syndrome):

- Utero-vaginal agenesis (partial or complete).
- 2nd most common cause of 1ry amenorrhea.
- Ovaries are normal with normally developed 2ry sex characters & normal karyotyping.
- Abdominal or transrectal ultrasound will confirm. Renal & skeletal abnormalities could associate.

(3) Complete androgen insensitivity syndrome (testicular feminization syndrome):

Definition: Male karyotype (46xy) with testes producing testosterone hormone but no receptors for androgen. Third most common cause of 1ry amenorrhea.

Clinical features:

- External genitalia will develop as female.
- Female 2ry sex characters will develop due to peripheral conversion of androgen to estrone.
- Scanty axillary & pubic hair.
- Testes will be present either intra abdominally or in inguinal hernia.
- At start of development, testes produces non androgenic substance called mullerian inhibitory factor (M.I.F). This will lead to absent uterus, tubes & upper 2/3 of vagina. Lower 1/3 only will develop as a blind pouch.

Treatment:

- Gonadectomy is done after normal female 2ry sex characters maturation as these gonads are liable in 20% for neoplastic transformation.
- Estrogen replacement therapy after gonadectomy.

(4) Ashermann Syndrome:

Definition: It is destruction of the basal layer of endometrium with intrauterine synechia.

Etiology:

- ***Surgical trauma*** is the commonest cause as curettage especially in cases of missed abortion. Rarely may it occur following other operations e.g. myomectomy, caesarian section.
- Tuberculous endometritis.

Clinically:

- Amenorrhea or oligo hypomenorrhea are most common.
- Infertility or recurrent abortion.

***Diagnosis*:**

- *History is usually characteristic (amenorrhea following curettage).*
- *Absent withdrawal bleeding following estrogen-progesterone administration.*
- *Hysterosalpingography (HSG): multiple irregular uterine filling defects.*
- *Hysteroscopic evaluation of uterine cavity:* diagnostic.

Treatment:

- Hysteroscopic adhesiolysis of intrauterine adhesions. Intra uterine balloon or IUD is placed for few days after surgery to prevent opposition of raw areas again.
- Cyclic estrogen and progesterone therapy after surgery to promote growth and healing of endometrium.

Prognosis: It depends on degree of endometrial damage and skill of the surgeon. If pregnancy occurs there is higher incidence of abortion or abnormally adherent placenta.

[II] Hypothalamo-pituitary-ovarian disorders:

1) Hypothalamic disorders

There is decreased GnRh pulse frequency and amplitude. This will lead to decreased gonadotropin secretion (↓ FSH, ↓ LH) with chronic anovulation and low serum E_2 level.

This could be classified into functional or non-functional causes.

(A) Functional hypothalamic amenorrhea:

More common, predisposing factors are:

- **Psychological stress**: most common e.g. emotional stresses or pseudocyesis.
- **Weight loss**: considerable loss to 15 – 20% of ideal body e.g. in anorexia nervosa as 17% body fat by weight is needed to initiate menstruation.
- **Exercise**: menstrual irregularities are common in athletes either due to decreased body fat or stress associating competition.
- **Drug induced** : tricyclic antidepressants, progestins, danazol, GnRH analogues & in 1% after prolonged contraceptive pill use (post pill amenorrhea)

(B) Non functional hypothalamic amenorrhea: Rare

- Inflammatory or neoplastic lesions (rare, other neurologic symptoms are present)
- Congenital Kallman syndrome (congenital absence of GnRH neurons with resultant amenorrhea & absence of 2ry sex characters. Patients also have anosmia due to associated absence of olfactory bulb.

2) Pituitary disorders

(A) **Hyperprolactinemia**: The most common pituitary cause of amenorrhea as high prolactin level suppresses hypothalamic GnRH secretion leading to low gonadotropin & E_2 levels.

(B) Pituitary insufficiency:

Most common type is Sheehan syndrome which is panhypopituitarism due to severe postpartum hemorrhage. It is specific for pregnancy with ischemia of anterior pituitary. The condition occurs when 95% of the gland are destroyed resulting in:

- Loss of prolactin hormone → failure of lactation (usually 1st evidence).
- Loss of FSH & LH with hypogonadism → amenorrhea & breast atrophy.
- Loss of T.S.H with hypothyroidism → apathy.
- Loss of A.C.T.H with hypocorticism → intolerance to stress & may be acute suprarenal failure with electrolyte imbalance (could be fatal).

Other rare causes for pituitary insufficiency could be irradiation, infiltrative neoplasms or inflammatory conditions (Simmond's disease).

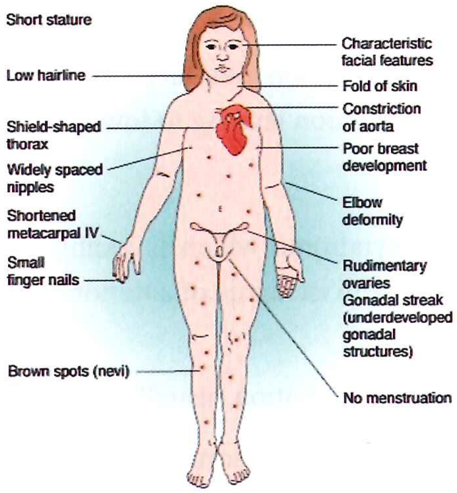
(C) Empty sella syndrome:

Large sella turcica as detected by radiologic imaging as CT but not entirely filled with pituitary tissue. It is a tumor like condition in which there is a defect in sellar diaphragm allowing C.S.F leak in sella turcica with compression & dysfunction of pituitary gland.

[3] Ovarian disorders

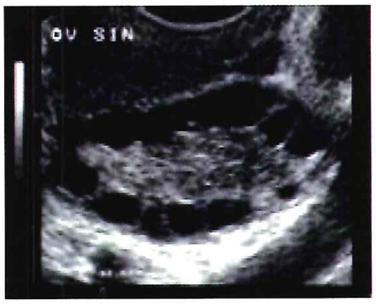
(A) Gonadal dysgenesis (Turner syndrome):

- Karyotyping is 45 XO.
- This is the commonest cause of 1ry amenorrhea.
- Gonads are streak i.e. only fibrous tissue with no germ cells.
- There is 1ry amenorrhea and underdeveloped 2ry sex characters.
- Associated special features as short stature, webbing of the neck, cubitus vulgus (increased carrying angle at elbow joint) are usually present. Other common associated anomalies as coarctation of aorta and cardiac anomalies.
- Mosaic form 45XO – 46XX may be present. Features are not classic; some development & menstruation may be present but premature ovarian failure/ insufficiency (POI) usually occurs.


Short stature
Low hairline
Shield-shaped thorax
Widely spaced nipples
Shortened metacarpal IV
Small finger nails
Brown spots (nevi)
Characteristic facial features
Fold of skin
Constriction of aorta
Poor breast development
Elbow deformity
Rudimentary ovaries
Gonadal streak (underdeveloped gonadal structures)
No menstruation

(B) Chronic anovulation:

The most common is P.C.O. ….. see (ovulatory disorders).



(C) Premature ovarian failure/ insufficiency (POI):

Premature exhaustion & depletion of follicles before age of 45 years. This could be constitutional, genetic, autoimmune or exposure to irradiation or infection. Menopausal symptoms as hot flushes usually occur with high FSH levels.

(D) Resistant ovary syndrome:

There are normal follicles inside ovary but no receptors for FSH & LH. In most of cases it is a temporary condition.

[III] Miscellaneous disorders:

a. **General diseases** as marked obesity, severe malnutrition, uncontrolled diabetes or renal impairment (suppression of ovulation).

b. **Endocrinological causes** as hypothyroidism with increased T.S.H. resulting in hyperprolactinemia or Cushing syndrome with increased adrenal activity and androgen production.

Management of a case of amenorrhea

Diagnostic work up includes proper history taking, examination & specific investigations to reach a diagnosis.

History taking:

- Type of amenorrhea, 1ry or 2ry.
- Development of 2ry sex characters in 1ry amenorrhea.
- Exclude physiologic causes as pregnancy is the commonest cause of 2ry amenorrhea.
- Check outflow disorders e.g. cyclic lower abdominal pain in crypto menorrhea or curettage (Ashermann syndrome).
- Check hypothalamic disorders e.g. psychological stresses, heavy exercises or drugs.
- Check pituitary disorders e.g. galactorrhea, postpartum hemorrhage (Sheehan syndrome).
- Check ovarian disorders e.g. hirsutism with P.C.O., family history of premature menopause, previous radio or chemotherapy.
- Check miscellaneous causes as general diseases & history suggestive of any endocrinologic troubles.

Examination:

- ***General examination:***
    - 1ry amenorrhea we have to examine 2ry sex characters development, stature & specific features of Turner syndrome & Cushing syndrome.
    - Hirsutism, galactorrhea.
    - General and endocrinologic diseases.
- ***Local examination:***
    - Inspect external genital in cases of 1ry amenorrhea for any abnormality as enlarged clitoris or bulging hymen.
    - Recto-abd. ex. in virgins or vagino-abdominal ex. In non-virgins to detect any uterine or adnexal pathology.
- ***Specific investigations:***

  Depending on clinical suspect by history and examination, the following investigations may be indicated:

1) Hormone profile:

- Serum pregnancy test (if pregnancy is suspected).
- Serum prolactin (normally 4-29ng/ml). If markedly elevated (above 100ng/ml), brain imaging by C.T is mandatory to check pituitary tumors.
- Thyroid functions: T3, T4 and T.S.H.
- Pituitary FSH & LH: High levels confirm ovarian failure. Low levels confirm hypothalamic or pituitary cause. Inverted LH to FSH ratio suggests P.C.O. this is associated with increased testosterone level.

2) **Pelvic ultrasound:**

Transabdominal or transrectal in virgins and transvaginal in non-virgins to visualize pelvic organs.

This can diagnose:

- *Uterus:* Agenesis, hypoplasia, hematometra. Endometrial thickness & echogenicity correlate with cyclic hormonal changes.
- *Ovaries:* Streak gonads, P.C.O. with increased peripheral small follicles & increased stromal thickness, ovarian neoplasm.

3) **Karyotyping:**

Should be done in all cases suspected Turner, or POI for mosaic Turner.

4) **Brain imaging e.g. X-ray or CT sella turcica** (could be done to detect any intracranial lesion.

3) **Hysterosalpingography (HSG) and/or hysteroscopy** could be done in cases with suspected Ashermann syndrome.

Treatment of Amenorrhea:

Treatment is individualized according to cause of amenorrhea and desire of pregnancy e.g.

- Replacement therapy: E/P to induce growth of 2ry sex characters if not developed or as a replacement for cases with premature ovarian failure. Replacement by the defective hormone as thyroxin and corticosteroids in cases with Sheehan syndrome.
- Induction of ovulation in cases desiring pregnancy by various protocols according to affected compartment. (See induction of ovulation).
- Hyperprolactinemia is treated by dopamine agonists (see hyperprolactinemia).
- Psychotherapy in psychological cases.
- Weight reduction and induction of ovulation or cyclic progesterone in cases with P.C.O. (see P.C.O.).
- Surgical treatment e.g. for outflow obstruction (see before), gonadectomy in androgen insensitivity syndrome (see before) or removal of any tumor may be done.

Galactorrhea & Hyperprolactinemia

Definition of galactorrhea:

Milk let down from the breast in absence of recent pregnancy or lactation.

Physiology of prolactin hormone:

- ***Chemistry***: A polypeptide hormone secreted by lactotroph cells of ant. pituitary (acidophils).
- ***Control of section***: The hypothalamus produces prolactin inhibitory factor (P.I.F) mainly dopamine which causes tonic inhibition of prolactin secretion. Many substances may act as a prolactin stimulatory substance as T.R.H., T.S.H., E., P., dopamine antagonists, phenothiazines and stressful conditions.

- ***Functions of prolactin:***
  - Stimulation of lactation.
  - In higher levels, it suppresses the ovarian and pituitary functions.
- ***Levels of prolactin***: Normally from 4 – 29ng/ml. There is no change in its level during menstrual cycle. In pregnancy, the level increases up to 200ng/ml, its effect is prevented on breast due to high E. and P. levels. After labor, the level decreases gradually nearly to basal level and increases only with suckling.

Causes of galactorrhea & Hyperprolactinemia:

Galactorrhea is not necessarily associated with hyperprolactinemia as physiologically, in nearly all women who have lactated it is possible to express little milk from breasts for years afterwards. Hyperprolactinemia also may or may not be associated with galactorrhea.

- ***Hypothalamic causes***: decreased P.I.F which may be due to chronic psychological stresses, drugs as phenothiazines, dopamine antagonists, reserpine & ganglion blockers. It may be neoplastic.
- ***Pituitary causes:*** this could be functional or due to prolactinoma (microadenoma < 1cm or macroadenoma > 1cm) & some cases of empty sella syndrome.
- ***Other conditions***: Thyroid disorders, chronic renal impairment, some pulmonary diseases or thoracic surgery.

Clinical presentations of hyperprolactinemia and galactorrhea:

- Galactorrhea.
- Anovulation with resultant infertility, hirsutism, amenorrhea or dysfunctional uterine bleeding.

Investigations:

It is done in the workup of the presenting symptom, e.g. amenorrhea or infertility:

- *Prolactin level:* If very high (>100ng/ml) we suspect tumor producing prolactin.
- *X-ray sella turcica, C.T. skull* if pituitary tumor is suspected.
- *T.S.H.* to exclude hypothyroidism.

Treatment:

- Stop any causative drug.
- Thyroxin in hypothyroidism.
- *Bromocryptine (parlodel):* Dopamine agonist.
  - Side effects: mainly nausea and vomiting. Also blurring of vision and hypotension may occur. We usually start by a smaller dose at night and gradually increase the dose.
- *Cabergoline (dostinex):* dopamine agonist (1/2 tablet weekly for 4 weeks).
- Surgical removal of large tumors.

في الـ history بتسألها هل فيه شعرة حوالين الفم كل ما تشيلها بترجع؟

Hirsutism

Definition:

- ➢ Excess hair growth of the dark terminal type (coarse pigmented androgen dependent hair) in the midline areas of the body (e.g., lips, chin, abdomen and back).
- ➢ Excess hair growth to a socially disagreeable manner.

Types & sources of androgens in females:

[illegible] oral سؤال

- ➢ ***Testosterone***: the major circulating androgen in females, from ovaries and adrenal glands.
- ➢ ***Androstenedione***: from ovaries and adrenal glands.

Testosterone $\xrightarrow{5\alpha \text{ reductase}}$ DHT

- ➢ ***Dehydroepiandrosterone (DHEA) and its sulphated form (DHEAS)***: Weak androgens mainly adrenal glands (especially the sulphated form).
- ➢ ***Dihydrotestosterone***: The potent form in the hair follicle due to enzymatic reduction of testosterone.

Most active [illegible]

Etiology of hirsutism:

- ➢ ***Idiopathic (familial) commonest type***: either due to increased receptor activity of hair follicles or increased activity of 5 □-reductase enzyme which converts testosterone to more potent dihydrotestosterone.
- ➢ ***Ovarian Causes:***
    - o The commonest is P.C.O. (Look ovulatory disorders).
    - o Virilizing ovarian tumors producing androgen causes hirsutism and virilism. e.g. Sertoli-leydig cell tumors.
- ➢ ***Adrenal causes:*** e.g.,
    - o Cushing syndrome with trunk obesity, hypertension and diabetes due to ↑ ACTH.
    - o CAH (congenital adrenal hyperplasia): defect in one of enzymes responsible for cortisol synthesis e.g. 21 hydroxylase or 11 hydroxylase enzymes. This defect may be partial or complete. Defective cortisol leads to ↑ ACTH with ↑ adrenal androgen production.
    - o Androgen producing adrenal tumors.
- ➢ ***Iatrogenic (Drug induced)***: anabolic drugs containing androgens.

Investigations:

- ➢ Careful history and clinical ex. may suggest the cause and detect severity.
- ➢ Specific investigations :
    - o Total and free serum testosterone levels
    - o If ovarian cause is suspected, U.S. or laparoscopy could be done.
    - o If adrenal cause is suspected, DHEA and DHEAS are done.

Treatment:

- Treatment of the cause e.g. P.C.O. or surgical removal of tumors.
- Combined O.C.P. :
  - E. → Increase albumin binding globulin of testosterone.
- Cimetidine and spironolactone: It acts peripherally at receptor site.
- Cyproterone acetate: It competes with androgen at receptors and also decreases its synthesis. Diane is a combination of cyproterone and ethinyl estradiol could be given for 21 days starting from 5th day of cycle.

Treatment should be long lasting (at least 6 months). It will prevent abnormal growth of new hair but the hair follicles which are already stimulated to grow in an abnormal way (androgen effect) will persist even in absence of androgens. This hair should be removed repeatedly by ordinary methods or by electrolysis for the root of the follicles or by laser.

Menopause

Definition:

- ***Menopause*** (meno = menses, pause = cessation) : It is the physiologic cessation of menstruation which occurs at 52 years (ovarian follicles are depleted). The female is considered menopausal after 1 year of complete absence of menstruation at the expected age
- ***Climacteric***: The period of 1-3 years before actual menopause during which there is gradual decline in ovarian function.

Hormonal changes in menopause:

1. ***Estrogen*** : Estrogen level is decreased. The main circulating form is estrone which is produced by peripheal conversion of androstenedione (produced by adrenals) in peripheral tissues (fat and muscles).
2. ***Gonadotropins (FSH-LH)*** : As the ovarian function decreases there is gradual rise in FSH and LH. FSH levels > 30m.I.U/ml is diagnostic of menopause.
3. ***Androgens*** : Total androgens are usually not affected but there is increase in the free testosterone, due to decrease in the binding globulin produced by the liver (needs estrogen to be secreted).
4. ***Inhibin level decreases***: it is released from the Graafian follicles, so the level decreases by depletion of the follicles.

Menopausal problems:

Due to Progressive estrogen depletion:

a. Oligomenorrhea progressing to amenorrhea.

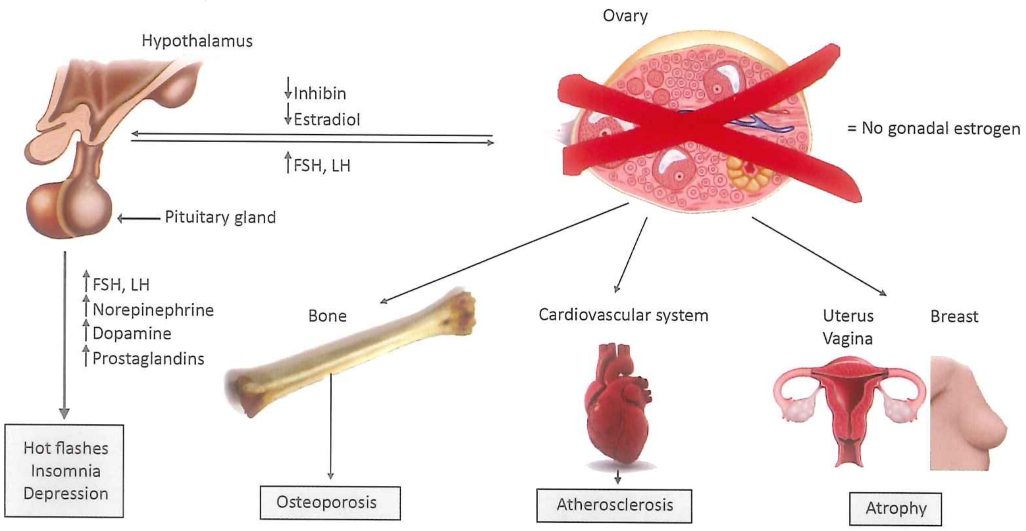
b. Vasomotor flushes: it is one of the major problems in climacteric period and menopause. Sensation of heat and cold sweating that persists for few seconds to few minutes and recur many times during the day. The actual cause is not clear. It may be due to stimulation of the thermoregulatory center in the hypothalamus causing skin temperature to rise while the core temperature doesn't change.

c. Gradual atrophy of genito-urinary organs as breasts, vagina, uterus, tubes, ovaries and urethra. Senile vaginitis or endometritis may occur and atrophy of uterine ligaments may predispose to genital prolapse. Also urinary symptoms as stress incontinence and burning micturition may occur.

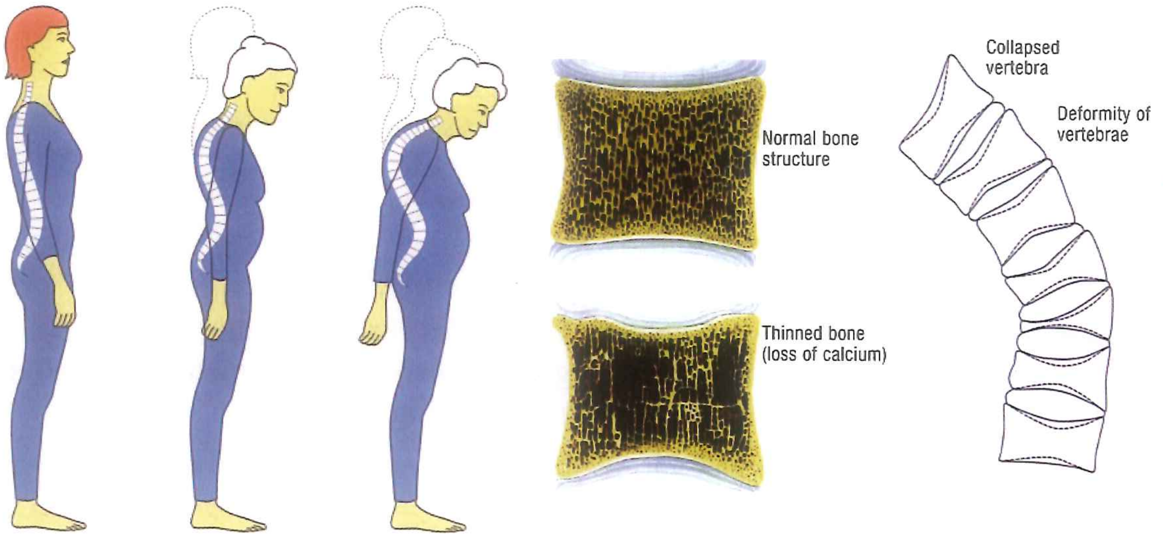
d. Osteoporosis with higher incidence of spinal and hip fracture. This is more common in thin patients with low dietary calcium content especially in smokers due to unopposed osteoclastic activity.

e. Atherosclerosis and hyperlipidemia with increased incidence of coronary heart diseases (E.prevents heart diseases by ↑ HDL and ↓LDL).

f. Others (menopausal syndrome): Fatigue, nervousness, insomnia, headache and depression. These symptoms are correlated more to aging process rather than to E.deficiency.


Hypothalamus
Ovary
↓Inhibin
↓Estradiol
↑FSH, LH
= No gonadal estrogen
Pituitary gland
↑FSH, LH
↑Norepinephrine
↑Dopamine
↑Prostaglandins
Hot flashes
Insomnia
Depression
Bone
Osteoporosis
Cardiovascular system
Atherosclerosis
Uterus
Vagina
Breast
Atrophy

Changes in both the ovary and the hypothalamus contributing to changes of the menopause


Normal bone structure
Thinned bone (loss of calcium)
Collapsed vertebra
Deformity of vertebrae

Osteoporotic changes in menopause

Management of menopause:

(A) Estrogen-Progesterone hormone replacement therapy (H.R.T.):

- It may be given to symptomatic cases to alleviate symptoms as severe hot flushes.
- Contra indications :
  - Absolute : Previous cancer breast or endometrial carcinoma – active liver disease – thrombo embolic diseases.
- Long term risks :
  - Thromboembolic disease during 1st year.
  - Slight increase in cancer breast after 5 years.
  - Increased risk of endometrial carcinoma with estrogen only regimen.

- Follow up of HRT cases :
    - Annual mammography.
    - Annual bone densitometry (DEXA).
    - Annual Pap smear.
    - Annual lipid profile
    - Annual TVS for endometrial thickness
- Types of hormones & routes of administration :
    - Estrogen : Estrogen could be given orally, vaginal or by transdermal patch to prevent hepatic 1st pass.
    - Gestagens : Progesterone derivatives are given orally.

(B) ***Alternative treatment for menopausal symptoms:*** They are used for a targeted problem as hot flushes or osteoporosis. When HRT is contraindicated or not accepted by the patient.

a. Hot flushes : Tranquilizers or some herbal preparations (phytoestrogen) may be effective.
b. Osteoporosis :
    i. Calcium (1200wg 1day) & vit. D for prophylaxix, not for therapy.
    ii. Bisphosphanates : orally once weekly, inhibit bone resorption.
    iii. Clacitonin: nasal spray, increase bone mass.
    iv. Selective estrogen receptor modulator (SERM) : estrogenic effect on bones only but may induce hot flushes.

N.B. :

-Premature menopause : Menopause <45 years (look amenorrhea).

-Delayed menopause : Menopause is delayed beyond 55 years. This might be constitutional or due to E. secreting ovarian tumor. There is higher incidence of endometrial carcinoma (many prefer to deal with these cases as postmenopausal bleeding cases).

-Artificial menopause : This is either surgically done or radiologically induced or by drugs as GnRHa.

Ovulatory disorders

[1] Anovulation

Causes:

I. Physiological:

- Before puberty.
- After menopause.
- During pregnancy.
- Variable period during lactation.

II. Pathological:

- Cases of amenorrhea due to hypothalamic, pituitary, ovarian or other general causes (see amenorrhea).
- Occasionally, it occurs with normal menstruation. This is more frequent in the few years following menarche or preceding menopause.

III. Induced: e.g., with oral contraceptive pills (O.C.P.) use.

Clinical Presentation:

- Infertility.
- Amenorrhea or oligohypomenorrhea.
- Irregular vaginal bleeding.
- Hirsutism.

Diagnosis: Detection of ovulation (see infertility)

Treatment: According to the presenting symptom and desire for pregnancy. Induction of ovulation if pregnancy is desired otherwise, symptomatic ttt is given e.g., cyclic estrogen and progesterone to obtain regular menstrual flow in amenorrhea.

Induction of ovulation:

1- Clomiphene citrate (clomid):

Nature: Synthetic, substance chemically related to estrogen.

Mode of action:

- It acts on FSH receptors.
- Weak estrogenic and anti-estrogenic effect.
- Estrogenic effect allows the drug to compete with endogenous estrogen for FSH receptors, thus increasing FSH level.
- Anti-estrogenic effect on the endometrium receptivity and cervical mucus.

Dose:

50 – 100mg orally daily for 5 days starting from D2.

Indications:

The hypothalamic – pituitary – ovarian axis must be functioning with estrogen production. This is proved by spontaneous menstruation or withdrawal bleeding after progesterone injection. e.g. cases with P.C.O.

Monitoring of ovulation:

As clomid therapy is cheap and is associated with mild side effects, simple monitoring by U.S. could be done. Ovulation is expected to occur about 5-10 days after treatment. Intercourse must be scheduled at this time every other day.

Side effects:

- Headache, blurring of vision.
- Failure of ovulation.
- Luteal phase defect with persistent infertility or abortion.
- Multiple ovulation and multiple pregnancies with higher incidence of abortion.
- Mild hyper stimulation syndrome (see later).
- Hostile cervical secretions due to anti-estrogenic effect on cervical mucus.

2- Tamoxifen:

Anti-estrogenic substance with the same action as clomid.

3- Human menopausal gonadotropins (HMG):

Nature:

F.S.H. and LH (75 I.U. of each). It was extracted from urine of post-menopausal females.

NB: Purified HMG (with only one unit of LH and 75 units of FSH), and recombinant FSH (with FSH and no LH) are also present with less side effects.

Mode of action:

It stimulates the ovaries directly so, by passing the hypothalamus and pituitary glands.

Dose:

IM injections daily from D2; modify the dose and duration according to response.

Indications:

- In cases where clomid failed or can't be used (e.g., nonfunctioning hypothalamus and/or pituitary glands with no estrogen production).

Monitor of ovulation:

- HMG therapy is expensive and is associated with marked side effects, intensive monitoring by U.S and estrogen level in blood is very important.

Side effects:

- Multiple ovulations and multiple pregnancies.
- The most serious is *ovarian hyper stimulation* syndrome *(O.H.S.S.)* which is more common to occur with *polycystic ovaries*.

- This usually occurs after H.C.G. triggering dose.
- It consists of marked ovarian enlargement with marked congestion.
- Ascites and haemoconcentration may occur.
- In more severe cases, pleural effusion or thrombo- embolism may follow endangering patient life. Ovarian torsion or internal hemorrhage may also occur.
- Prevention: by adjusting the dose and not to give H.C.G.if estradiol level is abnormally high (> 2000 p.g/ ml) or U.S. showed increased no. of small and intermediate follicles.
- Treatment: should be urgent I.V.hydration, thrombo prophylaxis and close monitoring of electrolyte balance or dyspnea.Patient may be admitted to I.C.U. and U.S.guided aspiration of tense ascites could be done.

4 -Gonadotropin releasing hormone analogues (GnRHa) and H.M.G.:

This is usually used in super ovulation before ovum retrieval in I.V.F.

Given in a daily S.C. doses followed by H.M.G.

It causes initial flare for endogenous gonadotropine secretion followed by suppression.

H.C.G is given 36 hours before retrieval to ensure final maturation of oocytes.

5-Dopamine agonists:

Indications: Cases with hyper prolactinemia or with high normal prolactin level, either alone or combined with clomiphen (see before).

6-Thyroxin: In cases of hypothyroidism.

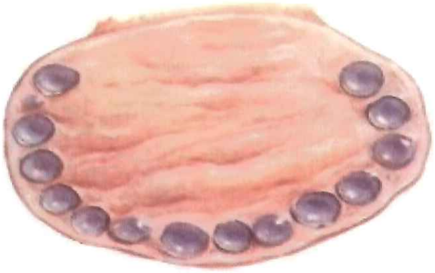
7-Surgical induction of ovulation:

- Removal of any androgenic tumor.
    - Laparoscopic ovarian drilling which is cauterization of the ovarian stroma. This is reserved to only to resistant cases with PCO but spread of thermal effect can damage the whole ovary and dense adhesions may follow.

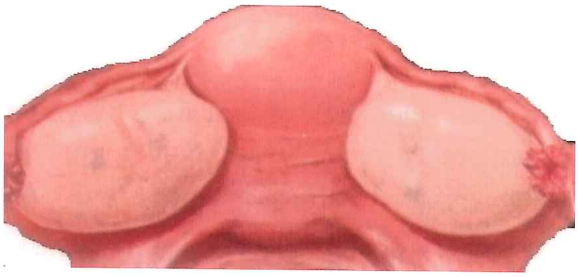
[2] Luteal phase defect: See infertility

[3] Polycystic ovarian disease (P.C.O.):

This was previously called Stein Leventhal syndrome (1935), a syndrome of sterility, obesity, hirsutism, amenorrhea. Nowadays, Rotterdam criteria (2013) describes PCO as disease of: anovulation, hyperandrogenism and US picture of ovaries, 2 out of 3 are needed to diagnose PCO.



Necklace appearance



seen during laparoscopy

Etiology:

The vicious circle has many entry points as:

- Hyperinsulinemia due to increased insulin resistance especially in patients with increased trunkal obesity. Elevated insulin level disturbs the axis mostly due to increased ovarian androgen production and decreased sex hormone binding globulin production from liver.
- Also, in obese, peripheral conversion of androgen to estrogen in fat depot is increased. This leads to more F.S.H. suppression with arrested growth of growing follicles.
- Recently a hereditary and genetic predisposition is claimed.

Clinical presentations:

Infertility … hirsutism … amenorrhea … dysfunctional metrorrhagia.

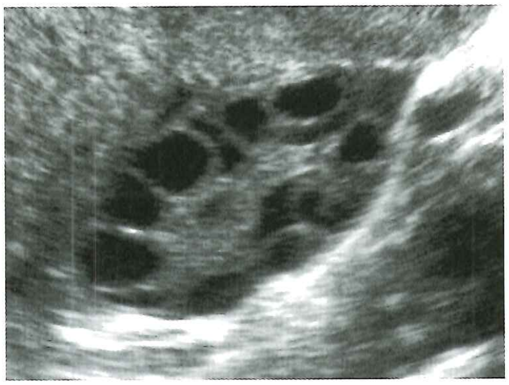
Complications:

- Higher incidence of endometrial hyperplasia or endometrial carcinoma in long standing cases.
- Higher incidence of cardiac diseases due to hyper androgenic state with disturbed lipid profile.
- Higher incidence of diabetes due to insulin resistance.

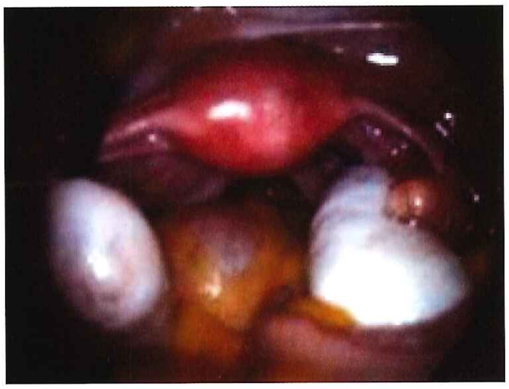
Specific investigations:

Diagnosed during investigating the presenting symptom.

- ***Laboratory***: Inverted L.H/F.S.H ratio done on D2 … elevated free testosterone level ….. decreased S.H.B.G. …. Increased fasting insulin level …
- ***Ultrasound***: Increased ovarian volume and number of peripheral small follicles with no dominant follicle and increased stromal thickness giving a necklace appearance, Adam's criteria.
- ***Laparoscopy***: Enlarged pearly white ovaries with no stigma of ovulation, Oyster shell appearance.



PCOS by TVS



PCOS by Laparoscopy

Treatment:

- Infertility cases: induction of ovulation by various methods as metformin, clomiphene citrate or H.M.G. preferably recombinant type to prevent hyper stimulation or premature L.H surge. Laparoscopic ovarian drilling is the last resort in some cases. Weight reduction is of a great help.
- Hirsutism cases: anti androgens as a cyproterone acetate and cosmetic therapy.
- Amenorrhea cases and dysfunctional bleeding cases: cyclic progestagens to regulate cycle and prevent endometrial hyperplasia. Oral contraceptive pills could be used if contraception is required.

Infections of Female Genital Tract

Natural barriers against ascent of infections

(1) Vulva:

- Apposition of labia with closure of introitus.
- Apocrine gland secretions (modified sweat) : acidic and fungicidal

(2) Vagina:

- Apposition of ant. and post vaginal wall.
- The stratified squamous epithelial lining of the vagina is resistant to infection. It is estrogen dependent.
- Acidic PH of the vagina (4.5). It is estrogen dependent as estrogen causes deposition of glycogen in epith. cells. Glycogen is acted upon by lactobacilli vaginal flora with production of lactic acid.

(3) Cervix:

Naturally, the cervix is closed by a mucus plug. It is disturbed at time of menstruation, delivery, abortion or any uterine instrumentations as sounding or curretage. Ascending infections are liable to occur at this time

(4) Uterus:

Monthly shedding of endometrium minimizes uterine infections

Factors affecting efficiency of natural barriers :

- *Age*: During childhood and after menopause estrogen is normally deficient with decreased integrity of vaginal stratified epithelium and vaginal acidity. Absent monthly endometrial shedding can predispose to uterine infection.
- ***Menstruation***: Cervical mucus plug is absent and vaginal acidity is lowered by alkaline menstrual blood.
- ***Puerpurium*** :
  - Uterus, cervix and vagina are widely opened (till involution is complete).
  - Vaginal acidity is decreased by alkaline lochia. Presence of raw placental site and lacerations (if any).
  - General resistance is usually low.

Female Lower Genital Tract Infections

Vaginitis

Types

2ry vaginitis

- Vesicovaginal fistula.
- Rectovaginal fistula and complete perineal tear.
- Irritant cervical discharge.
- Chemical irritation e.g. hot and concentrated douches.
- Mechanical irritation e.g. neglected pessary (for ttt of prolapse – no more used).

Treat the cause before ttt of infection.

1ry vaginitis

- During childhood: vulvovaginitis.
- Post menopausal: senile vaginitis.
- During childbearing period:
  - Bacterial vaginosis.
  - Monilia vaginitis.
  - Trichomonas vaginitis.
  - Puerperal vaginitis.
  - Specific infections as T.B-bihارziasis-syphilis.
  - Viral infections as herpes virus type I, II or H.P.V.

Vulvovaginitis of Children

Senile vaginitis (post-menopausal)

Predisposing factors

- Lack of estrogen so, impaired epithelium integrity and indequate vaginal acidity
- Lack of hygiene and contaminated clothes or W.C. are precipitating factors.

⋆ May be foreign body or oxyurius

⋆ May be malignancy with 2ry infection.

Organisms

Usually polymicrobial e.g E. Coli, staph, strept…..

Clinical picture

Vaginal discharge (usually purulent) and pruritus vulvae.

Investigations

⋆ Exclude foreign body (if suspected) by rectoabd. ex. or vaginoscope or pelvic x-ray.

⋆ Exclude oxyurius by recal swab.

⋆ Clinically, vagina is thin atrophic, pale and may be ulcerated.

⋆ Exclude malignancy especially if the discharge is serosanguinous. Cytology, colposcopy and curettage may be done if necessary.

- Culture and sensitivity tests for the discharge.

Treatment

- Appropriate broad spectrum antibiotics
- Correct the predisposing factor i.e., Estrogen deficiency:
  - ∗ Local estrogen creams could be used.
  - ∗ Local vaginal acidic douches as lactic acid could be used to improve vaginal acidity.

During childbearing period:

I- Bacterial vaginosis

The commonest cause of vaginitis in childbearing period.

Organism:

Previously, it was thought to be due to Gardnrella vaginalis, gram –ve rods. Recently it is believed to be due to alteration of vaginal bacteria flora with superimposed anaerobic infection, So it is called bacterial vaginosis.

Clinial Picture:

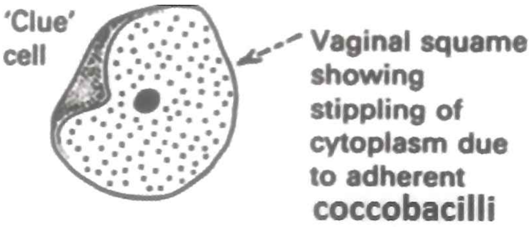
Thin, greyish – white discharge, malodorous. Mild puritus or sorness may be present. Vagina may be hyperemic on examination, but the cervix is not affected.

Investigations:

- Vaginal swab shows clue cells (vaginal epithelial cells with a serrated edges due to adherence of organisms).
- Gram stained film : absent lactobacilli and presence of gram –ve rods.
- Whiff test : addition of 10% KOH to discharge → fishy odour.
- PH > 4.5 (decreased lactobacilli).

Treatment:

Metranidazole 500mg twice daily for 1 week. No need to treat the partners.


'Clue' cell
Vaginal squame showing stippling of cytoplasm due to adherent coccobacilli

Clue Cells in Bacterial Vaginosis

II - Monilia vaginitis **(2nd most common cause)**	**III -Trichomonas vaginitis** **(Third most common)**
Causative organism	
Fungal infection by candida albicans is most common.	Trichomonas vaginalis (motile protozoon). It is slightly larger than a leucocyte with 4 anterior flagellae & long tail. It can affect also the urethra, Skene's tubules.
Predisposing factors	
- If flourishes in highly acidic medium so, it is more common in premenstrual period, during pregnancy and O.C.P. users. - It flourishes in CHO rich medium e.g. diabetics. - It flourishes in patients receiving antibiotics for long periods, with alteration of vaginal flora and superimposed fungal infection. - In immunosuppressed patients e.g. corticosteroid therapy.	- It flourishes in weak alkaline medium (p:5.5-6.5), so it is more common in post menstrual period.
Mode of infection	
- Contaminated towels - The fungus may be present in the vagina & flourishes if there is a predisposing factor.	- Sexual transmitted. - Contaminated towels.

Clinical Picture

- Sligh discharge which is white, thick, cheesy.	- Excess discharge which is yellow, thin, frothy, malodorous.
- Marked pruritus vulvae.	- Mild pruritus vulvae.
	- Frequency of micturition & dyspareunia, may be present.

Examination

The discharge with its specific features can be detected

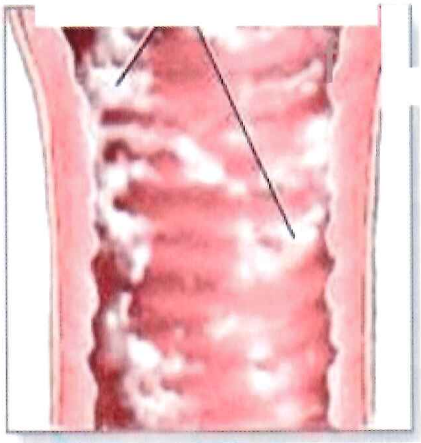
- The discharge is adherent to vagina, its removal can cause slight bleeding. Vagina is diffusely red & tender. There may be diffuse reddening of the vulva (scratch marks) and intercrural region especially in diabetics (monilia vulvo vaginitis).	- Vaginal rugosities show small red hemorrhagic spots due to protozoal capillaritis. (strawberry vagina). the cervix also may show spots (strawberry cervix) or cervical erosion. Mild scratch marks due to pruritus may be present.

Investigations

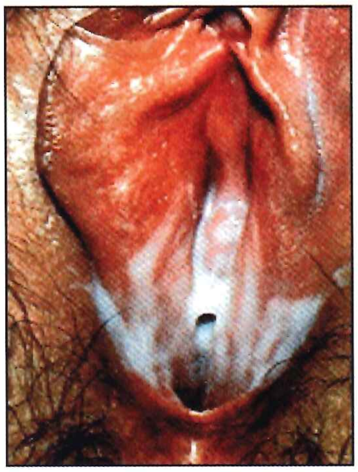
- Fresh drop ex. (by adding a drop of worm, fresh saline to the discharge and microscopic ex.) can show the hyphae of the fungus.	- Fresh drop ex. can show the moving protozoan.

Treatment

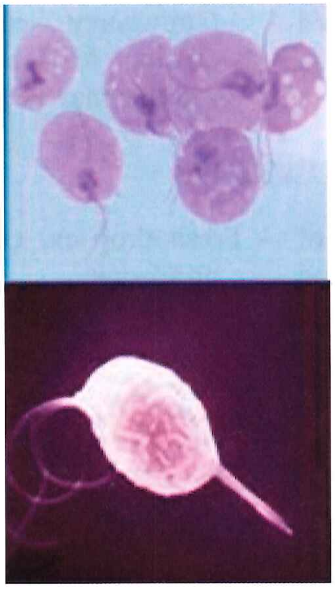
Local Nystatin	**Metronidazole (Flagyl)**
vaginal pessaries daily or Creams for vulval affections	2gm orally once. The male partner should be treated.. It causes GIT upset and metallic taste.
Local Nystatin can be used during pregnancy.	They are not used during first trimester of pregnancy. In first trimesteric pregnant patients, clotrimazole vaginal pessaries are used.
- Oral Imidazole derivatives once weekly. It is the best for virgins. It is not used during pregnancy or in liver diseases.	
- Alkaline vaginal douches to decrease vaginal acidity.	
- Any predisposing factor e.g., D.M. should be treated & local cleanliness is important	- Acidic vaginal douches to improve vaginal acidity.



Candida albicans on vaginal walls



Candida albicans vaginal discharge



Trichomonas vaginalis

Cervicitis

[1] Acute Cervicitis

Causes:

Puerperal infections, gonorrhea, infected lacerations following instrumentations & operations.

Clinical Picture:

Symptoms : Mucopurulent discharge, backache & dyspareunia.

Signs : red, swollen, tender, cervix.

ttt : Antibiotics: Doxycycline 100 mg bid for 7 days.

N.B. : Acute cervicitis tends to be chronic due to :

- No monthly shedding of cervical mucosa.
- Racemose (branching) pattern of cervical crypts prevents proper drainage.

[2] Chronic Cervicitis

It is a common sequel of acute cervicitis. .

Clinical Picture:

Symptoms :

1. Mucopurulent discharge.
2. Contact bleeding, if there is cervical erosion.
3. Infertility due to infected hostile discharge.
4. Chronically infected cervix acts as a septic focus causing malaise, with chronic fatigue.
5. Backache due to spread along uterosacral ligament.
6. Menorrhagia & congestive dysmenorrhea (Pelvic congestion).

Signs :

Speculum ex. will reveal one or more of the following :

1. Mucopurulent discharge pouring out of the cervix.
2. Cervical erosion (definition & mechanism : look cervical erosion).
3. Cervix is swollen, edematous, hyperemic.
4. Ectropion : ant. & post lips are reverted due to bilateral cervical lacerations with exposure of cervical canal.
5. Mucous polypi : one or more red, pedunculated polyps projecting from ext. os due to hypertrophy of endocervical epithelium.
6. Nabothian follicles; Small bluish or yellowish projections on portio-vaginalis. They represent distended cervical glands with secretions due to blockage of their ducts.

Investigations:

1. Exclude cancer cervix especially in relatively old patients with suspicious cervix (markedly infected cervix with large cervical erosion). Pap smear, colposcopy or even biopsy could be done.
2. Bacteriologial ex. of the discharge rarely needed in resistant cases.

Treatment:

(1) Cauterization: If there is cervical erosion.

Types : (Electrocuatery – cryocautery – chemical cautery – laser cautery)

- *Side effects :*
    - 2ry hemorrhage : about the 10th day due to separation of the slough (commoner to occur if deep cautery is done). If the bleeding is severe, hospitalization, blood transfusion, vaginal pack and antibiotics are given.
    - Parameteritis.
    - Stenosis of cervix & infertility if excess cauterization is done.

Cervical Erosion

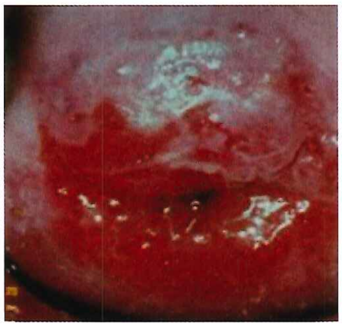
Defintion :

Red area beside the external os due to replacement of the stratified squamous epithelium by thin columnar epithelium which shows the blood vessels underneath.

Causes :

1. **Chronic cervicitis** :
    - The excessive infected discharge from the endocervix leads to devitalisation and denudation of an area of stratified squamous epithelium around the cervix.
    - The denuded area is then covered by columnar epithelium which grows out from the cervical canal (1st healing phase).
    - After sometimes the stratified squamous epithelium, in an attempt of healing may grow to cover the columnar epithelium resulting in blockage of ducts of cervical glands and formation of retention cysts called Nabothian follicles (2nd healing phase).
    - Exacerbation of infection leads to repetition of the whole process.
2. **Hormonal erosion** : Relatively excess estrogen and progesterone (mainly estrogen) stimulate the columnar epithelium to grow outside aroud ext. os.
   This might occur during pregnancy or in oral contraceptive pills users.
3. **Congenital erosion** : Due to persistence of the intrauterine condition i.e. the squamo-columnar junction is outside the external os.

Clinical Picture:



Cervical erosion

Sympotms :

- Mucous discharge and sometimes contact bleeding.
- Other sympotms of chronic cervicitis if it is the cause (discuss).

Signs :

- Bleeding on touch could be elicited by P.V.
- Speculum examination will demonstrate red area beside ext. os and may be other signs of cervicitis (discuss).

Investigations:

- Exclude malignancy in relatively old patients (Pap smear, colposcopy and may be biopsy).

Treatment:

- Manage chronic cervicitis (see before).
- Hormonal erosion needs no ttt as it resolves 3-6 months after labor. If due to O.C.P., change the type of pills to low estrogen content type or use another method of contraception.
- Congenital erosion : repeated follow up to exclude malignancy. Some recommed reepated scrapping of the epithelium by wooden spatula to induce transformation into squamous epithelium.

Vaginal Discharge

Definition :

The term leucorrhea means white discharge and should be used to describe the white non infected discharge due to excess of the normal secretion or transudation but it is frequently used to describe all genital discharge except bleeding.

Investigations of a case of vaginal discharge:

(1) *History* :

I. Personal history :

- *Age* : Bacterial vaginosis, monilia & trichomonas are common in adult life. Senile vaginitis and malignancies are common in old age.
- *Married or not* : e.g post partum and postabortive infections, vesicular mole, P.R.O.M.

II. Present history :

- *Characteres of discharge* : Color, odour, relation to menstrual flow, associated pruritus vulvea (look monilia and trichomonas).
- *Associated symptoms* : e.g that of chronic cervicitis or malignancy.

III. Past history :

- Diseases e.g. D.M. (Monilia infection).
- Drugs as O.C.P. (Monilia infection).

IV. Menstrual history :

Congestive dysmenorrhea points to pelvic congestion.

(2) *Examination* :

- No intercourse or vaginal douche for 24 hours. No ttt for 1 week.
- Local ex. Using non lubricated gloves and speculum to detect local disease in the genital tract and to examine the characters of the discharge.

(3) *Special investigations* : (Look vaginitis)

- Fresh drop ex. (can diagnose monilia. Trichomonas and gradenella vaginalis).
- Stained film or culture for monilia, trichomonas or gardenella (Amsel criteria).
- Discharge from urethra, vagina or cervix could be used for bacteriological ex.
- Vaginal cytology and biopsies from suspicious areas for malignancy.
- Specific tests according to the case e.g antibody titre for chlaydia.

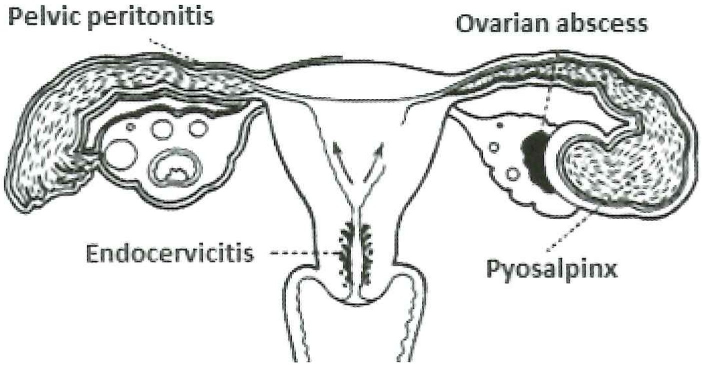
Treatment of vaginal discharge :

- ttt of the cause if present
- Local cleanliness and daily hygenic habits.

Female Upper Genital Tract Infections

Pelvic Inflammatory Disease (P.I.D.)

- It is a clinical syndrome resulting from ascending spread of organisms from vagina and endocervix to upper genital tract as endometrium, fallopian tubes and pelvic peritoneum.
- This could occur in an acute or chronic form. The most important type of P.I.D is salpingitis.



Salpingitis and Salpingo-oophoritis

[I] Acute Salpingitis (Acute P.I.D)

Organisms:

Usually polymicrobial, the commonest organisms are : Gonococci, Chlamydia trachomatis. Others may also contribute to infection as: Mycoplasma, Anaerobes, Staphylococci. Streptococci, E. Coli, gardenella and others.

Routes of infection:

- *Ascending infection* : (Along lumen or lymphatics and veins).
  - Along the lumen e.g. gonococci. They are non motile but are carried over sperms or by retrograde menstrual flow.
  - Along lymphatics and veins e.g. staphylococci, streptococci, E. coli. They are common in puerperal infections.
- *Direct spread* from neighboring infected organs e.g. appendicitis, diverticulitis, infected fibroid or ovarian cyst.
- *Blood born* infection from distant site.

Predisposing factors:

- *Age* : Childbearing period (mainly sexually transmitted).
- *Parity* : it is more common in multipara.
- *Socioeconomic class* : Commoner in low socioeconomic class due to bad genital hygiene.
- *Contraception* : Commoner in I.U.D. users due to ascending infection at time of insertion and along threads of the loop.
- *Operations and instrumentations of cervix and uterus* : e.g. following dilatation and curettage due to disturbance of cervical mucus plug with higher liability for infection.

Pathology:

Infection is bilateral with affection of the ovaries (salpingeo-oophoritis). It may start as :

- *Acute endosalpingitis* : gonococcal infection, it starts in mucus membrane destroying the cilia and spread to a variable extent in the muscle wall.
- *Acute intestinal salpingitis* : e.g. puerperal and post abortive infections, it starts in the muscle wall and the mucus membrane is affected afterwards.
- *Acute perisalpingitis*: e.g. spread from neighboring organ, it starts at the outer surface and may spreads inwards.

According to the degree of severity 2 forms could be present :

- Acute catarrhal salpingitis : mild form, affects only the mucus membrane in the form of edema, congestion and serous exudate.
- Acute suppurative salpingitis : severe form, affect all layers with pus formation leading to pelvis peritonitis, adhesions and may be abscess formation.

N.B. : Due to double blood supply of the fallopian tube (uterine a. and ovarian a.) gangrene never develops.

Complications:

- ***Early complications :***
  - Abscess formation (tubo-ovarian abscess) which may rupture into peritoneal cavity with septicemia and septic shock.
- ***Late complications :***

  It is due to chronicity of infection with tubal damage leading to :

  - Infertility (about 15% after 1st attack, 30% after 2nd attack and 75% after 3rd attack).
  - Ectopic tubal pregnancy.
  - Pelvic adhesions with chronic pelvic pain, dysparunia and possible intestinal obstruction.
  - Repeated acute attacks.

Clinical Picture:

History :

Predisposing factor e.g. recent labor or abortion, I.U.D. insertion or operation.

Symptoms :

- *Generally* : Fever, headache, malaise, anorexia and may be rigors and vomiting in severe cases.
- *Abdominally* : Bilateral lower abdominal pain.
- *Locally* : Leucorrhea or offensive vaginal discharge and may be slight vaginal bleeding due to marked congestion.

Signs :

- *Generally* : High temperature and rapid pulse rate.

- *Abdminally* : Bilateral lower abdominal rigidity, tenderness and rebound tenderness especially at tubal points (1/2 inch above mid inguinal ligament).
- *Locally* :
  - Bimanual ex. reveals bilateral tender adenexae and marked tenderness on moving the cervix on either side. Speculum ex. may reveal marked cervicitis and pus coming out from cervix.
  - If pelvic abscess develops. The pain becomes throbbing, fever becomes hectic and bilateral adnexal masses or tender fullness in post. fornix could be detected.
  - If the abscess is ruptured in the peritoneal cavity, evidence of shock, collapse and generalized peritonitis occurs.
  - Some cases are subclinical (especially chlamydia infection causing silet PID) and presents later by complications as infertility.

Differential Diagnosis:

- ***Acute appendicitis*** : Pain starts around the umbilicus, then it settles on Rt. iliac fossa. McBurney's point is tender.
- ***Ruptured ectopic pregnancy*** : Amenorrhea followed by pain then bleeding. No pyrexia. There is unilateral pain and tenderness. B.HCG is confirmatory.
- ***Twisted ovarian cyst*** : No pyrexia, mass is felt on examination and by U.S.
- ***Cystitis and Pyelitis*** : Other symptoms of urinary tract infection as frequency, dysuria are present and urine analysis reveals pus cells.

Specific investigations:

Aim : To document infection & differentiate from other causes of acute abdomen e.g. ectopic pregnancy.

- *Blood picture* : Leucocytosis with shift to the left (increased staff nucleated W.BCS).
- Elevated E.S.R and C-Reactive protein.
- Bacteriological ex. of endocervical discharge is of little value due to polymicrobial nature of the infection.
- Complete urine analysis for exclusion of renal troubles.
- U.S. and B.HCG may be needed to exclude ectopic pregnancy.
- Laparoscopy could be done for diagnosis in doubtful cases.

CDC Criteria for Diagnosis of Acute PID (2015)

Cervical motion tenderness or uterine tenderness or adnexal tenderness.

One or more of the following additional criteria can be used to support a diagnosis of PID:

- Oral temperature >38.3°C
- Abnormal cervical mucopurulent discharge or cervical friability
- Presence of abundant numbers of WBC on saline microscopy of vaginal fluid
- Elevated erythrocyte sedimentation rate
- Elevated C-reactive protein and
- Laboratory documentation of cervical infection with N. gonorrhoeae or C. trachomatis.

Treatment:

** General measures* :

- Hospitalize cases.
- Rest in Fowler's position (to localize pus in Douglas pouch).
- Light diet with excess fluids or I.V. fluids if vomiting is present.
- Analgesics and antipyretics.

**** Antibiotics :***

Broad spectrum as they should cover aerobic gram +ve and gram –ve organisms, anaerobes, chlamydia and mycoplasma as follows:

CDC antibiotic regimens (2010)

A. **IM regimen** is indicated in mild-moderate cases of acute PID. The recommended drugs are:
Ceftriaxone 250 mg IM single dose **PLUS**
Doxycycline 100 mg orally twice a day for 14 days
WITH or WITHOUT
Metronidazole 500 mg orally twice a day for 14 days

B. **IV regimen** is used in severe PID cases, which require hospitalization. IV regimens are continued for at 24-48 hours after clinical improvement then oral treatment is continued to complete 14 days. The recommended drugs are:
Cefotetan 2 g IV every 12 hours **OR**
Cefoxitin 2 g IV every 6 hours
PLU
S*Doxycycline* 100 mg orally/12 hours

**** Surgical measures :***

- If pelvic abscess develops and not responding to medical ttt or there is evidence of rupture immediae laparotomy for drainage should be done.
- In some selected cases the abscess could be drained vaginally by post. colpotomy (fixed, mild line abscess and dissecting rectovaginal septum).

Chronic Salpingitis

It is always a sequel of acute salpingitis except in T.B. which starts as chronic.

Pathological types :

<table>
<tr><th>1. Hydrosalpinx</th><th>2. Pyosalpinx</th></tr>
<tr><td>- Follows catarrhal salpingitis</td><td>- Follows suppurative salpingitis</td></tr>
<tr><td colspan="2">- The fimbrial ends become indrawn closing the abdominal ostium and the tube becomes retort shape</td></tr>
<tr><td>- It is filled with serous fluid.</td><td>- It is filled with pus.</td></tr>
<tr><td>- Tube is thin walled (can reach large size) and is surrounded by mild adhesions.</td><td>- Tube is thick walled (does not reach large size) and surrounded by dense adhesions. The uterus becomes retroverted and fixed.</td></tr>
<tr><td>- Rarely hydrosalpinx may leak intermittently from uterine end (intermittent hydrosalpinx).</td><td></td></tr>
</table>

3. Chronic interstitial salpingitis :

If follows acute interstitital salpingitis. The wall is thickened and often studied with interstitial abscesses. The lumen may remain partially patent and stenosed predisposing to tubal pregnancy.

4. Tubo-ovarian cyst :

It is a hydrosalpinx and inflammatory ovarian cyst.

5. Tubo-ovarian abscess :

It is a pyosalpinx and ovarian abscess.

6. T.B. salpingitis (see T.B.).

Clinical Picture:

Symptoms :

- Dull continuous lower abdominal pain and backache.
- Symptoms of pelvic congestion as menorrhagia, congestive dysmenorrhea and leucorrhea.
- Dyspareunia.
- Infertility ***.
- Recurrent acute exacerbations.
- General ill health due to the septic focus.

Signs :

- Bilateral, elongated, fixed, tender, cystic swellings could be felt in adnexal region.
- Uterus may be retroverted and fixed due to adhesions (pyosalpinx).

Special Investigations:

- *U.S.:* May show adnexal mass.
- *H.S.G. – Laparoscopy:* usually done in the workup of infertility. Tubes are dilated, blocked with peritubal adhesions preventing free spill of the dye.

N.B. : H.S.G. should not be done if the infection is recent or there is tender bimanual ex. as flaring up of infection may occur.

Treatment:

1. ***Conservative ttt*** : for ttt of chronic pelvic pain. 5% icthyol glycerine pessaries to diminish pelvic congestion, treat coexisting cervicitis and antibiotics in acute exacerbations.
2. ***Surgical ttt*** :
   - Young patients desiring pregnancy : tubal disconnection should be done prior to IVF to improve success rate.
   - Older patients with enough children, abdominal panhysterectomy is a definitive ttt.

Endometritis

Acute endometritis:

Causes :

- Usually puerperal or post abortive (look puerperal sepsis).
- It may follow operations as curettage. Rarely it follows I.U.D. insertion.
- Transient endometritis may occur with gonococcal infectiion.

Chronic endometritis:

It is rare during childbearing period due to monthly shedding of endometrium.

Causes :

- T.B: as it affects the basal layer of the endometrium which is not shedded.
- Infection on top of placental polyp or degnerated fibroid.
- Rarely with I.U.D. insertion (actinomyces like organisms).
- Senile endometritis due to ascending infection and the atrophic changes in endometrium with absence of monthly shedding.

Treatment:

- Exclude malignancy (F.C. must be done in post menopausal cases).
- Antibiotics.
- Estrogen in senile endometritis.
- Drainage of pyometra by dilatation of cervix.
- Hysterectomy could be done in old age.

Pyometra

Definition: Pus collection inside the uteurs.

Aetiology: Infection and blockage of cervix e.g. :

- Endocervical or endometrial carcinoma.
- Stenosis of cervix after radiotherapy and in some cases of senile endometritis.

Clinical Picture:

- Generally : Fever, headache, malaise, anorexia.
- Locally : Intermittent purulent discharge, symmetrically enlarged tender cystic uterus and passage of a uterine sound is followed by discharge of pus. This may be difficult and risky due to higher incidence of perforation and peritonitis.

Treatment:

- Exclude malignancy and if present manage accordingly.
- Drainage by dilatation of cervix under anaesthesia and fixing a rubber tube. Antibiotics should be given.
- Hysterectomy could be done especially in old patients & recurrent cases.

Genital T.B.

Organism:

Human T.B. bacilli (acid fast, alcohol fast bacilli which stains with Zeil Nilsen stain).

Routes of infection:

It is almost 2ry T.B. to 1ry focus anywhere in the body, most frequently the lung, less often the bowel and peritoneum. The 1ry focus is not always evident. It reaches the genital tract through :

- Blood born infection (most common).

- Along the lymphatics or by direct extension from the peritoneum.

Pathology:

- It occurs most frequently in childbearing age.
- Tubes are involved in 100% of cases and infection is bilateral. The ovaries are involved in 25% of cases and the uterus in 50% of cases.
- **N.E.P.** :

▣ ***Tubes*** : (Perisalpingitis, interstitial salpingitis or endosalpingitis):

a. *T.B. perisalpingitis :* (Adhesive type) : It is part of T.B. pelvic peritonitis. The tubes are slightly enlarged with thick wall and dense adhesions around.

b. *T.B. interstitial salpingitis* : The tubes are thickened, tortuous, convoluted and is surrounded by adhesions (salpingitis isthmica nodosa).

c. *T.B. endosalpingitis* : The commonest from as it tends to localized first in the mucosa. Caseous material may be seen pouring form the abdominal ostium and the fimbriae stand out like a tuft (pipe stem appearance)

▣ ***Uterus*** : The basal endometrium is replaced by a layer of T.B. granulation tissue and caseation. Adhesions and obliteration of the uterine cavity may occur (Asherman S.)

▣ ***Cervix-Vagina and vulva (very rare)*** : Commonly ulcerative lesions (single or multiple serpiginous ulcers with undermined edges and yellowish necrotic floor).

M.P. : All lesions show tubercles with giant, epithelioid and round cells.

Clinical Picture:

Symptoms :

- Infertility : usually 1ry infertility due to tubal, uterine and may be ovarian involvement (5-10% of infertility cases are due to T.B.).
- Menstrual disorders : Menstrual function may be normal or shows irregularities as amenorrhea, oligohypomenorrhea.
- Abdominal pain : Vague lower abdominal pain may occur if 2ry infection occurs.
- Discharge : May occur in tuberculous endometritis or cervical ulcers.

Signs :

- Sometimes, no abnormality could be detected.
- Tender fixed adenexal swelling may be felt.
- Small nodules in Douglas pouch may be felt.
- Ascites and fixed abdominal masses could be detected with T.B. peritonitis with adhesions.
- T.B. ulcer on cervix or on the vulva.

Investigations:

Usually diagnosed in the work up of infertility cases.

- ***Premenstrual endometrial biopsy*** : Full curettage of endometrium. Specimen is preserved in saline for bacteriological ex., and guinea pig inculation & culture on Lovenstein Jenssen medium.

- ***Hystrosalpingeography*** : Dwarf uterus, proximal tubal obstruction or pipe stem rigid tubes with lymphatic intravasation.
- ***Laparoscopy*** : T.B. pyosalpinx is characterized by the following diagnostic points that differentiate it from pyosalpinx due to pyogenic organisms :
    - Sausage shape tube.
    - Pallor of the tissues with dense surrounding adhesions.
    - Tubercles on the surface, caseous material and may be calcification.
    - The fimbriae are not indrawn but may project out like a tuft.
- ***Biopsy*** : from cervical, vaginal or vulval ulcer.
- ***Chex X-ray*** : to detect any active 1ry focus.
- ***Tuberculin test*** : of little value. If –ve it exclude T.B.
- ***Blood analysis*** : lymphocytosis and high E.S.R.

Treatment:

Medical ttt :

Anti-tuberculous drugs as : isoniazide (INH) & rifampicin. ttt is continued for 1 ½ to 2 years. Fertility is seldom restored.

Surgical ttt :

- Tubal plastic surgery is contraindicated as flaring up of T.B. infection usually occur. IVF and E.T. may be helpful in some cases but also the results are poor.
- Excision of large masses not responding to ttt. Abdominal panhystrectomy could be done if pregnancy is not desired (difficult operation due to adhesions).

Sexually Transmitted Diseases

These diseases include :

(1) Gonorrhea. (2) Syphilis. (3) Trichomonas vaginalis. (4) Chlamydia. (5) Herpes simplex. (6) Lymphogranuloma inguinale. (7) Granuloma inguinale. (8) Chancroid. (9) Condyloma acuminata (HPV). (10) AIDS. (11) others as mycoplasma, hepatitis B, pediculosis & scabies.

BACTERIAL SEXUALLY TRANSMITTED DISEASES

1. Gonorrhea in Female

Organism: Neisseria gonorrhea (Gram –ve intracellular diplococci)

Route of infection:

- Sexual intercourse (commonest).
- Infected towels (vulvovaginitis in children).
- Ophthalmia neonatorum may occur due to infection during passage through the birth canal.

Incubation period: 2 – 7 days.

Sites of involvement & clinical picture :

1ry sites :

areas with columnar epithelium are easily involved :

1. Urethra & skene's tubules → Frequency and burning micrurition.
2. Endocervix → backache, mucopurulent discharge and edemeous hyperemic cervix.
3. Bartholin's gland →Tenderness, redness, edema & may be abscess.
4. Vagina is protected in adults (St. Sq. epth.) but may be affected in children as the epithelium is thin → vaginitis with purulent discharge.

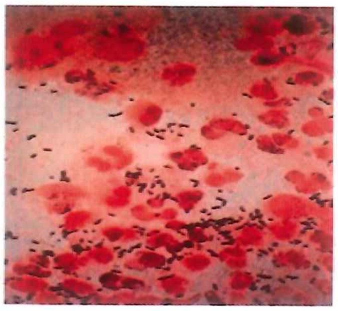
2ry sites :

1. The tubes, ovaries & pelvic peritoneum →acute endosalpingitis (spread occur along the lumen especially at time of menstruation).
2. Uterus → Transient endometritis (due to monthly shedding.

Systemic infection :

Very rare e.g. arthritis, tenosynovitis, iridocyclitis or endocarditis. This might occur during pregnancy or in immunosuppressed cases.

Investigations:



A. **Gram stains:** shows Gram negative diplococci within polymorph nuclear leucocytes (PNLs).

B. **Culture** on Thayer-Martin medium; besides being highly accurate.

Treatment:

CDC regimens for treatment of uncomplicated N. Gonorrhoea (2010)

A- Uncomplicated genital, urinary and rectal infections:

Ceftriaxone 250 mg IM in a single dose

PLUS

Azithromycin 1g orally in a single dose

OR

Doxycycline 100 mg a day for 7 daysexcluded

- No test of cure is required.
- Sex partners within 60 days of appearance of symptoms should be evaluated and treated forgonorrhea and chlamydia

B- Disseminated gonococcal infections: Ceftriaxone 1 g IM or IV every 24 hours then cefixime 400mg orally twice daily to complete 7-14 days of treatment

N.B. : The male partner should be investigated and ttt to prevent reinfection.

2. Chlamydia Infection

Organism :

Chlamydia trachomatis is the second most commonly reported STD in many countries. It is an obligatory intracellular Gram-negative bacterium that causes chlamydial genital infection.

Chlamydia grows only intracellular as do viruses. They attack only columnar epithelial cells causing mild inflammatory reaction usually localized to the infected area without deep tissue invasion.

Routes of infection :

Sexual intercourse.

Incubation period: 6 – 14 days.

Sites of involvement and clinical picture:

- The commonly colonize the cervix causing cervicitis either asymptomatic or with mucopurulent discharge. Vaginal involvement may also occur.
- Upward spread to the fallopian tube with resultant salpingitis may occur (it is responsible for subclinical types of P.I.D. that presents later on with infertility due to tubal damage).

Diagnosis :

A. **Microscopic examination** of endocervical secretions.

B. **Culture:** from endocervix is a highly specific technique although expensive, and results are difficult to standardize, thus limiting its use.

Treatment:

CDC regimens for treatment of uncomplicated cases of urethritis and cervicitis (2010)

Azithromycin: 1 g orally once (4 tablets 250 mg each), suitable during pregnancy
OR
Doxycycline: 100 mg orally twice daily for 7 days (not used in pregnancy)

NB: Sexual partner should be treated

3. Chancroid

Chancroid is a genital ulcerative disease, caused by the Gram negative coccobacillus **Haemophilus ducreyi**. The disease is generally rare, but may occur as outbreaks of infection.

Clinical picture: Lesions begin as small papules that later break into painful genital vulval ulcers in 2-3 days that may be accompanied with inguinal lymphadenopathy.

Diagnostic investigations: Cultures and PCR for chancroid are not readily available in many centers. Probable diagnosis is made when painful genital ulcers are present without evidence of herpes, or syphilis.

Treatment (CDC 2010):

- *Azithromycin: 1g orally once* **OR**
- *Ceftriaxone 250mg IM single dose.*

4. GRANULOMA INGUINALE

It is a genital ulcerative disease, caused by a gram-negative bacterium Klebsiella granulomatis.

Epidemiology: The disease is endemic in some countries as India and Africa.

Clinical picture: Painless friable ulcerative genital lesions with inguinal swelling but without lymphadenopathy.

Diagnostic investigations: Scrapings from the ulcers show pathognomonic cells known as Donovan bodies.

Treatment (CDC 2010):

- *Doxycycline* 100 mg orally twice a day for at least 3 weeks and until all lesions have completelyhealed **OR**
- *Azithromycin* 1 g orally once per week for at least 3 weeks and until all lesions have completelyhealed.

5. LYMPHOGRANULOMA VENERUM

Lymphogranuloma venereum (LGV) is caused by ***C. trachomatis serotypes L1, L2, and L3***, producing local and regional ulcerations and destruction of genital tissues.

Epidemiology: LGV is a rare disease that is endemic in some parts of Africa and India.

Clinical picture: Primary genital ulcers appear 3-5 weeks after exposure and resolve spontaneously. 2 to 6 weeks later tender 2ry unilateral inguinal lymphadenopathy develops that can break into ulcers.

Treatment (CDC 2010): Doxycycline 100 mg orally twice a day for 21 days.

VIRAL SEXUALLY TRANSMITTED DISEASES

1. HERPES SIMPLEX VIRUS

Herpes simplex virus (HSV) is a double strand DNA virus of two main types:

- ***HSV 1:*** primarily transmitted by non-venereal routes particularly following contact with infected saliva. It is responsible for facial and oropharyngeal infections.
- ***HSV 2:*** is usually transmitted by venereal route to the sexual partner, or maternally to the new born during vaginal delivery. It is responsible for genital herpes and neonatal infections, and has been linked epidemiologically with carcinoma of the cervix.

CLINICAL PICTURE (Symptoms & Signs)

- **The first attack:** is the most severe with pain, vulvitis, Lymphadenopathy, and discharge. It occurs after an incubation period of around 21 days, and is manifested by multiple painful anogenital vesicles or painful ulcers with erythematous base that usually resolve after 3-4 weeks.

DIAGNOSTIC INVESTIGATIONS

- **Culture of serum** collected from vesicles by aspiration or by swabbing base of the ulcer.

TREATMENT

- First attack: Acyclovir 400 mg orally three times a day for 7–10 days. Treatment can be extended if healing is incomplete.

2. HUMAN PAPILLOMA VIRUS (HPV)

The genital virus in this double stranded DNA family is responsible for a variety of mucocuta- neous genital lesions, commonly resulting in genital warts (condyloma accuminata). HPV is also associated with female LGT cancers especially cervical intraepithelial neoplasia (CIN).

EPIDEMIOLOGY:

- **Types of HPV:** HPV types 6 and 11 are the usual causes for visible external warts. HPV types 16, 18, 31, 33, and 35 have all been strongly associated with CIN and with external genital squamous intraepithelial neoplasia.

Mode of transmission:

- *Contact with infected male partners:* yield a risk of 60-80% for contracting genital warts, with an incubation period (IP) ranging from 6 weeks to 18 months (mean 3 months).
- *Maternal to fetal transmission:* through transplacental, intrapartum, or postnatal routes. Fetal affection may cause neonatal and juvenile respiratory papillomatosis.

CLINICAL PICTURE (Symptoms & Signs)

- **Asymptomatic:** genital HPV are frequently asymptomatic.
- **Skin lesions** (genital warts or condylomata acuminate): appear on the vulva and peri-anal region as warty like, scattered and multifocal lesions. Secondary infection will result in an irritating itchy sensation.

DIAGNOSIS OF HPV

- **Direct inspection:** easily diagnose overt warts. Biopsy is rarely required, only if in doubt.
- **Pap smear test:** demonstrates the pathognomonic koilocytes or hallo cell exfoliated from the cervix, designated as low-grade squamous intra-epithelial lesions (LSIL).
- **Colposcopy:** on staining with 1% acetic acid lesions appear as flat, small, acetowhite areas, with vascular punctuation or mosaicism.

- **HPV DNA test**: is a diagnostic procedure that uses a small plastic spatula to collect material from the cervix and vagina. This sample allows identification of 14 high risk types of HPV, including HPV 16 & HPV 18.

TREATMENT OF EXTERNAL CONDYLOMAS (CDC 2010)

- **Podofilox** 0.5% solution or gel administered by the patient
- **Destruction:** using cryotherapy, Podophyllin resin 10%–25%, Trichloroacetic acid (TCA) or Bichloroacetic acid (BCA) 80%–90% or surgical removal.

TREATMENT OF HPV RELATED PRECANCEROUS CONDITIONS (CDC 2010)

- **Destruction of abnormal cells** via colposcopy using laser ablation or cryotherapy.
- **Surgical excision** by Loop electrode excision of the transformation zone (LEETZ)

N.B: Vaccination against HPV was introduced in the USA in 2006. It is recommended in young girls, years before starting sexual activity. This will hopefully decrease infection and subsequent development of CIN.

3. HUMAN IMMUNODEFICIENCY VIRUS (HIV)

HIV was first identified in 1981 as a retrovirus that causes acquired immunodeficiency syndrome (AIDS).

HIV has a variable and long asymptomatic latent period that ranges from months to years in which patients are asymptomatic carriers.

EPIDEMIOLOGY

- HIV is worldwide. Men are affected more than women, but prevalence in women seems to be increasing.
- Most of infections are caused by HIV type I. HIV type II is rare and less virulent.
- Modes of transmission:
  - ☐ **Horizontal transmission:** from one sexual partner to another through micro-abrasions of the mucous membranes or through skin penetration by needles.
  - ☐ **Vertical transmission:** from an infected mother to the fetus by trans-placental route.

CLINICAL PICTURE (Symptoms & Signs)

1. **Asymptomatic:** 80% of HIV infected cases remain asymptomatic for around 10 years
2. **Initial HIV exposure:** fever, sweats, headache, pharyngitis, myalgia, and arthralgia.
3. **AIDS is the final stage**: with associated generalized lymphadenopathy, Kaposi sarcoma, opportunistic infections, malaise, diarrhea, and weight loss.

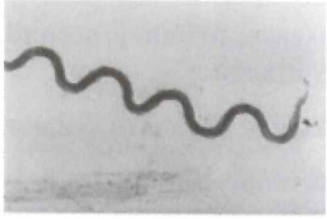
DIAGNOSTIC INVESTIGATIONS

1. **Western blot analysis:** Confirmatory test for ELIZA positive cases.
2. **Viral load testing for HIV plasma RNA:** if acute retroviral syndrome is suspected.

TREATMENT (CDC 2010)

1. Immediate medical care and referral to specialized centers.
2. Prophylaxis for opportunistic infections by vaccination against pneumococcal infection, Hepatitis B, measles, and haemophiles influenza B.
3. There is now a great development in antiretroviral therapy as well as vaccination against HIV that helped in reducing the disease prevalence and improved prognosis.

Syphilis



Treponema pallidum

Organism: Spirochaete (Treponema pallidum).

Routes of infection:

- Sexual intercourse (commonest).
- Blood transfusion.
- Transplacental infection to fetus.

Incubation period: 10 – 90 days.

Clinical Picture :

- *1ry shphilis :* Chancre (on vulva, vagina, cervix). It starts as raised papule → painless ulcer (shallow , punched out, necrotic floor, indurated base). It is associated with painless L.N. enlargement.
- *2ry syphilis:* Appears 6 weeks to 6 months after the 1ry lesion. It includes.
  - Maculo-papular skin eruption.
  - Mucous patches : greyish white that ulcerates later on in the mouth and throat.
  - Condyloma lata : Flat, raised, moist, necrotic areas on vulva and perineum with slight genealized L.N enlargement.

N.B. : Serological tests are +ve at this stage.

- 3ry syphilis : this occurs in untreated cases (years after the chancer). Localized syphilitic granuloma (gumma) may develop in any part of the body. Cardiovascular lesion may develop in advancer cases.
- Congenital syphilis: due to materno-fetal transmission may cause still birth, nonimmune hy- drops, jaundice, infant hepatosplenomegaly, and skin rash. Identification of and treatment of pregnant women with diagnosed syphilis is the mainstay of prevention for congenital syphilis.

DIAGNOSTIC INVESTIGATIONS

- **Dark field examination:** of fresh specimens obtained from tissue exudates and mixed with saline detects spirochetes in the primary and secondary stages of the disease.
- **Serologic tests:** In primary disease serology may be negative until individuals have enough time to mount an immune response. In secondary and tertiary syphilis serologic test are helpful in diagnosis.
  1. **Non treponemal tests:** Rapid Plasma Reagin (RPR) and Venereal Disease Research Labora- tory (VDRL) measured in titers, usually correlate with disease activity. These tests may givefalse positive results being positive in a variety of other medical conditions.
  2. **Treponemal antibody tests:** Fluorescent Treponemal Antibody Absorption (FTA-ABS) and

T. pallidum Particle Agglutination (TP-PA) can remain positive for life although may turn negative with early treatment. These tests are specific and used to confirm the diagnosis.

TREATMENT (CDC 2010)

A. Early disease; primary, secondary, early latent and asymptomatic recent contacts:

- *Benzathine penicillin G* 2.4 million units IM in a single dose
- *Doxycycline* 100 mg orally twice daily for 2 weeks in non-pregnant patients with penicillinallergy

B. Late disease: late latent syphilis or tertiary syphilis (not including neurosyphilis)

- *Benzathine penicillin* G 2.4 million units IM every week for 3 weeks
- *Doxycycline* 100 mg orally twice daily for 4 weeks in non-pregnant patients with penicillinallergy

C. Neurosyphilis:

- *Aqueous crystalline penicillin* G 18-24 million units/day IV infusion for 10-14 days.
- *In pregnant or penicillin sensitive cases:* Penicillin desensitization.

D. Congenital syphilis: infants and children with history of inadequate maternal treatment

- *Early disease:* Aqueous crystalline penicillin G 50.000 unit/kg IM single dose up to theadult dose.
- *Late disease:* Aqueous crystalline penicillin G 50.000 unit/kg IM up to the adult dose everyweek for 3 weeks.

Infertility

Definition:

Inability to conceive after 1 year in spite of regular marital life and without use of contraception.

- ***1ry infertility:*** conception had never occurred.
- ***2ry infertility***: Failure of conception after a period of previous fertility. 2ry infertility is considered after a longer period (2 years) if there was a period of lactational amenorrhea and an ovulation after previous childbirth

Incidence: 10 – 15%.

For normal young couple, chance of conception per cycle is around 20- 60% after 6 months of unprotected intercourse & up to 85% become pregnant after 1 year.

Causes of infertility:

- Male causes.
- Female causes.
- Disturbed sexual relation.
- Unexplained infertility.

[1] Male causes:

Either due to failed spermatogenesis, failed transport or failed deposition in vagina.

- *Congenital*: Bilateral undescended tests leading to impaired spermatogenesis.
- *Traumatic*: Surgical trauma as bilateral ligation of the vas deferens. This may occur accidentally in surgical repair of inguinal hernia.
- *Inflammatory*: mumps with destruction of germ cells, T.B. and Gonorrhea might lead to obstruction of the vas deferens.
- *Others*:

- Smoking impairs spermatogenesis.
- Exposure to marked heat e.g., occupational or due to varicocele may impair spermatogenesis. Some believe that frequent, steam baths and tight clothes may be responsible.
- Exposure to irradiation also may contribute.

[2] Female causes:

The single most important factor in fertility is maternal age. The highest female fertility is around age of 25, it decreases by 50% by the age of 35 and decreases sharply after 37.

Ovarian causes:

- **Persistent anovulation**:

- *Hypothalamic causes* e.g. psychological stress or drugs as antidepressants.
- *Pituitary causes* e.g. hyperprolactinemia or Sheehan syndrome.
- *Ovarian causes* e.g., polycystic ovarian disease (P.C.O.), chromosomal abnormalities, premature menopause.

- **Luteal phase defect**:

- This may cause infertility (3-5% of cases) or more common pregnancy loss.
- Ovulation occurs but there is a defect in the luteal phase in the form of:
    - *Inadequate corpus luteum function* (short life span or inadequate progesterone production).

      This could be due to poor growth of follicles in the 1st half of cycle, hyperprolactinemia or drugs as synthetic progestagens or clomiphen citrate.
    - *Inadequate endometrial response*. This could be a 1ry defect in endometrium or 2ry to pathology as infection, uterine polyp or fibroid.
- Diagnosis & treatment: (see later).

	Tubal causes	**Uterine causes**	**Cervical causes**	**Vaginal causes**
Congenital	Aplasia, hypoplasia	Aplasia, hypoplasia. Other cong. Anomalies as bicornuate or septate uterus are more related to habitual abortion	Aplasia, hypoplasia, elongation, maldirection or marked stenosis.	Aplasia, vaginal septum
Traumatic	**Surgical Trauma**			
	e.g., : Tubal ligation e.g. following unsuccessful attempt of tuboplasty	e.g., : Asherman syndrome (intrauterine synechia) following over currettage with removal of the basal layer of endometrium	e.g., : Excessive amputation or cauterization of cervix	
Inflammatory	Salpingitis (**) e.g. puerperal, gonococcal or T.B. and pelvic peritonitis e.g., ruptured appendix or after surgery.	T.B.	Chronic cervicitis with hostile cervical secretions	Vaginitis with hostile vaginal discharge
Neoplastic	Broad lig fibroid with tubal kink	Fibroid(mainly submucus polyp---see fibroid)	Fibroid (mainly fibroid polyp---see fibroid)	
Others	Endometriosis causing marked pelvic adhesions (Peritoneal factor)		Sperm antibodies either locally produced by the cervix (IgA) or systemically produced (IgG and IgM)	

* **General diseases:** Marked obesity, D.M., or others, mainly through inhibition of ovulation.

[3] Disturbed sexual relation:

***Male*:** Failure of deposition of semen in the vagina e.g. impotence, premature ejaculation or marked hypospadias.

Female:

- Vaginismus: Violent reflex spasm of levator ani, gluteal muscles and adductors of the thigh on any attempt of sexual relation, No P.V. could be done to these patients. This could be psychological or 2ry to a painful lesion of the vulva and vagina.
- Dyspareunia (painful intercourse): It might indicate pelvic pathology, e.g., endometriosis, chronic cervicitis, salpingitis or impacted fibroid.
- Effluvium seminis: Rapid escape of semen from the vagina after intercourse. In spite of being a common complaint by couple, it has no clinical importance or role in infertility.

Rate of intercourse:

- Too infrequent intercourse (average is twice weekly); it may not coincide with time of ovulations.
- Too frequent intercourse may produce immature sperms.

[4] Unexplained infertility:

There is no apparent cause & all standard investigations (semen analysis, tubal patency test & laboratory assessment of ovulation) are normal. These cases are about 10-15% of infertile cases.

Investigations for infertility (Male and Female):

Male investigations:

- History and examination to detect any of the previously mentioned causes.
- Specific investigations :

Semen analysis:

- It is the 1st step to evaluate an infertile couple.
- If the result is abnormal, it should be repeated again to confirm.
- It should be done 3-5 days after the last ejaculation.
- The specimen is obtained by masturbation (with no lubricants) in a clean glass jar and examined within 1 hour.

Normal figures are:

- Volume: 2 – 5c.c.
- Reaction: alkaline (pH 7.4).
- Count: minimum is 15 million/cc.
- Motility: 50% or more motile (GI, GII) within 1 hour.

According to W.H.O motility has 4 grades:

G I : Progressively motile

G II: moderate motility,

G III: sluggish motility,

G IV: immotile.

- Morphology: 15% or more normal forms.

Abnormal semen analysis: This may be in the form of the following:

- Azospermia → no sperms. Testicular biopsy is needed to differentiate 1ry testicular defect from bilateral vas obstruction.
- Oligospermia → decreased count (<15 million/c.c.)
- Asthenospermia → weak sperms with decreased motility.
- Necrospermia → dead sperms.
- Aspermia → no semen e.g. retrograde ejaculation (in diabetics).

Female investigations:

(History taking, clinical ex. and specific investigations)

A) Detection of ovulation:

History:

Symptoms suggestive of ovulation are:

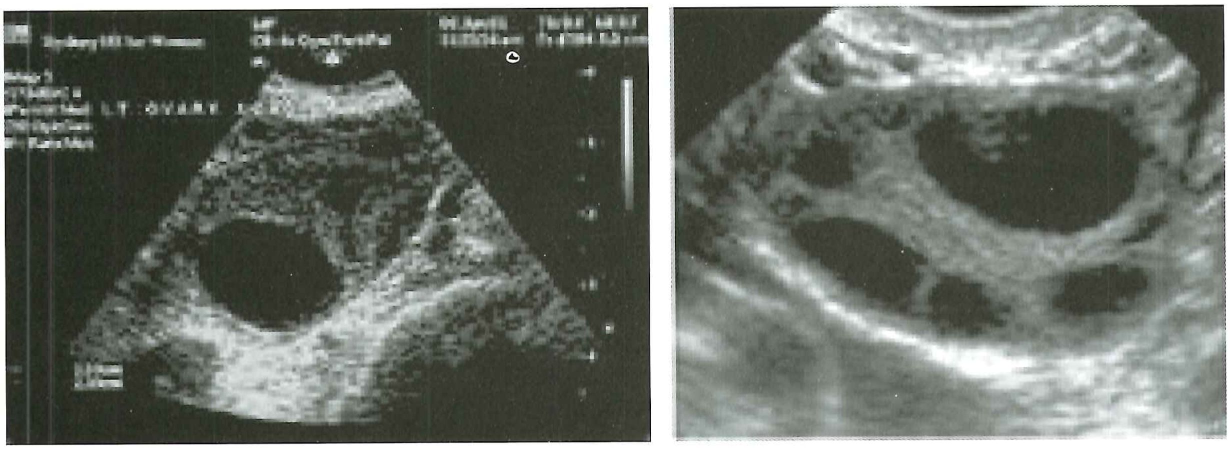
- Regular cycles.
- Midcyclic ovulatory :
    - Pelvic pain (Mittelschmerz) due to rupture of the follicle
    - Discharge (ovulatory cascade) due to maximum estrogen effect on cervical secretions just before ovulation.
    - Bleeding due to temporary drop of estrogen level after ovulation.
- Premenstrual mastalgia.
- Spasmodic dysmenorrhea.

Examination: Galactorrhea, hirsutism, marked obesity and other general diseases are suggestive of anovulation.

Specific Investigations:

- ***Ultrasnonographic folliculometry (the most commonly used):***

Vaginal U.S is done serially starting from day (10) of the cycle to monitor growth of the follicles and to detect ovulation, whereas the dominant follicle at 18-20mm diameter collapses and fluid in Douglas pouch is detected.



Preovulatory follicle by TVS

- ***Hormone estimation:***
  - Detection of LH peak in urine using specific strips. It occurs 12-24 hours before ovulation and appears in urine few hours later.
  - Progesterone level (at day 21 of the cycle) :
    - ○ Levels > 10 nanogram/ml (nanogram – 1/1000 microgram) indicates ovulation with adequate corpus luteum.
    - ○ Levels between 5-9 nanogram/ml indicate ovulation with inadequate corpus luteum (Luteal phase defect).
    - ○ Levels < 5 nanogram/ml indicates anovulation.
  - Prolactin level:

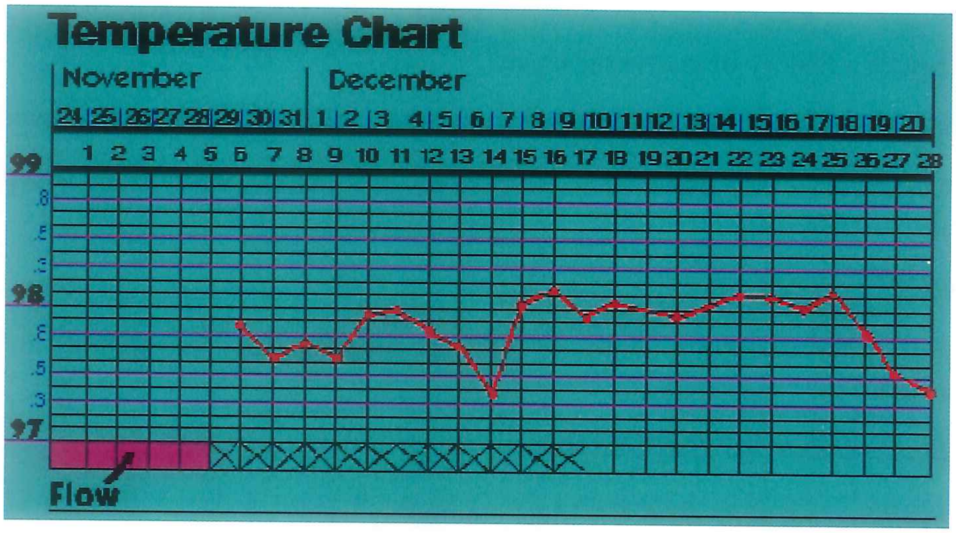
    Normally 4 – 20 ng/mL. High levels suppress ovulation.
  - Thyroid functions and androgen profile especially in cases with irregular cycles.
  - Tests for ovarian reserve:
    - ○ Day 1-3 FSH & LH levels: High FSH (>10) suggests poor reserve while inverted ratio with LH: FSH > 2 suggests P.C.O.
    - ○ Other tests may be needed in older age especially if assisted reproductive technique as I.V.F. is considered as ultrasonographic assessment of antral follicle count and measurement of anti mullerian hormone(A.M.H.)
- ***Dated premenstrual endometrial biopsy (Dilatation and curettage):*** obsolete

○ Done 2, 3 days before menstruation

○ To detect ovulation by finding good secretory endometrium. Luteal phase defect can by diagnosed by finding weak secretory endometrium. Anovulation is diagnosed by presence of proliferative endometrium.

- **Screening tests:** Easy screening tests (could be repeated monthly) but unreliable.
  - ***Basal body temperature chart (B.B.T.)***
    - ○ Biphasic with higher level by 0.2 – 0.5°C in the 2nd half of the cycle.
    - ○ This is due to thermogenic effect of progesterone on hypothalamus.

- The elevation of temperature should persist for 12-14 days. This is the normal life span of corpus luteum, if less than 11 days, luteal phase defect is suspected.



Biphasic BBT

- ***Cervical mucus studies:***

There is a change in the pattern from estrogen effect in the 1st half of the cycle (+ve thread & ferning test) to progesterone effect in the 2nd half of the cycle (–ve thread test and –ve ferning)

Thread (Spinnbarkeit) test:

- It is a test for strechability i.e. the ability of cervical mucus to be drawn into threads.
- A drop of mucus is placed between the tips of an artery forceps and is gradually opened. The length of threads before they break denotes the result.
- It is maximum at time of ovulation (>9cm – estrogen effect) and gradually becomes –ve in the 2nd half of the cycle (progesterone effect).

Ferning test:

- It is a test for Na Cl and mucin contents of cervical mucus.
- A drop of mucus is left on a slide to dry and then it is examined microscopically. A characteristic branching appearance will be evident.
- It is maximum at time of ovulation (++++, estrogen effect) and gradually becomes –ve in the 2nd half of the cycle (progesterone effect)

- ***Vaginal smears:***

There is a change in the pattern from estrogen effect in the 1st half of the cycle with increased number of shedded superficial cells to progesteron effect in the 2nd half the cycle with increased number of shedded intermediate cells.

N.B.:

Luteal phase defect is diagnosed by:

- Serum progesterone level at day 21 is 5-10 nanogram/ml.
- Dated premenstrual endometrial biopsy will denote that endometrium is out of phase by more than 3 days.
- B.B.T. may denote short luteal phase (less than 11 days).

B) Detection of tubal factor of infertility:

History:

- There may be a history of puerperal sepsis.
- There may be a history suggestive of salpingitis e.g. acute abdominal pain, fever, discharge.
- There may be a history suggestive of endometriosis e.g. dysmenorrhea, dysparunia and irregular bleeding.

Examination:

Inflammatory tubal swelling could be felt on bimanual ex. or nodules in Douglas pouch (in endometriosis).

Specific investigations for tubal patency:

- ***Hysterosalpingeography (H.S.G):*** Most commonly used

Method:

- About 6-8 c.c. of radio-opaque dye as lipidol (40% organic iodine in poppy seed oil) is injected in the uterus by a special cannula.
- It is done immediately after menstruation.
- Usually done without anesthesia.
- Antispasmodic may be given to prevent tubal spasm.

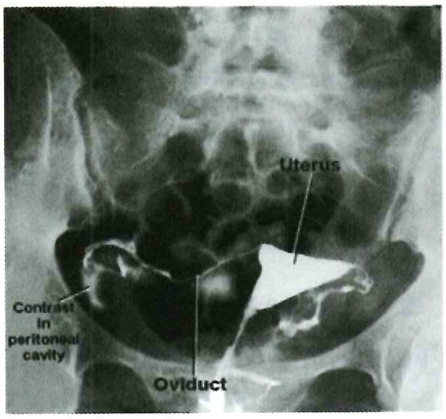
An x-ray is taken after the injection which shows the outline of the uterus and both tubes. The cannula is then removed and after 24 hours a 2nd film will show the peritoneal spill due to scattering of the lipidol by intestinal movements.

Results:

- It the tubes are healthy the dye will passe from the tubes to the peritoneal cavity with free spill.
- It the tubes are blocked the dye will stop at site of obstruction with no peritoneal spill.
- If there are peri-tubal adhesions the dye will collect into locules in the peritoneal cavity.

N.B.:

Water sol. media containing 40-60% iodine (e.g., urografin) may be injected instead of the lipidol oil as they are more safe (no oil embolism or granuloma) and are quickly absorbed. The 2nd film is taken after ½ hour.



Uterine cavity with no filling defects, and bilateral tubal patency

Advantages:

A) Diagnostic values:

- It reveals any abnormality of the uterine cavity as bicornuate uterus, submucous fibroid (Filling defect) or Asherman syndrome (obliterated cavity).
- It localizes the site of tubal block (unilateral or bilateral-proximal or distal).
- It can detect peri-tubal adhesions.
- It can suggest T.B.: dwarf uterus, proximal tubal block or beaded tubes with lymphatic intravasation.

B) Possible therapeutic values:

- The hydrostatic pressure of the fluid used can dislodge mucus plugs (questionable value).

Disadvantages:

There is high incidence of false positive and false –ve results especially in diagnosis of peri-tubal adhesions.

Complications:	***Contraindications:***
a. Ascending infection and flaring up of T.B.	a. Active pelvic infection or pelvic tenderness on bimanual ex.
b. Oil embolism.	b. During menstruation or abnormal uterine bleeding as there is opened sinuses.
c. Endometriosis.	c. During premenstrual period as endometrium is thick.
d. Disturbance of possible pregnancy.	d. During premenstrual period or during a period of amenorrhea.
e. Pain, collapse and allergic reaction to iodine and iodine granuloma.	e. General disease contraindicating pregnancy and cases with iodine allergy.

- ***Laparoscopy:*** (Gold standard)

Diagnostic laparoscopy

Indications:

- It should be done in every case where H.S.G. revealed tubal abnormality to confirm the diagnosis with possibility of operative laparoscopic treatment.
- In cases with unexplained infertility to diagnose hidden pathology as endometriosis.

Advantages: Diagnostic and therapeutic

- It confirms tubal patency & assesses tubal damage.
- It diagnoses hidden pathology as pelvic endometriosis or T.B.
- Stigma of ovulation and corpus luteum could be detected.
- Therapeutic value as lyses of adhesions could be done through laparoscope. In this case, it is preferable to be done in post menstrual period as vascularity is diminished.

C) Detection of uterine factor:

History:

- History of previous operation on the uterus e.g. curettage especially in the post-partum period (Asherman syndrome).
- History of repeated abortions, may suggest congenital anomalies of the uterus.
- Menstrual irregularities as amenorrhea, oligohypomenorrhea (T.B. or Asherman synd.) or menorrhagia or metrorrhagia (fibroid uterus).

Ex.: To detect size of the uterus and its length by a sound.

Specific investigations:

- ***Ultrasonography:*** to diagnose size of uterus and any uterine tumor.
- ***Hysterocontrast ultrasonography (sonohystrography) :***

  Injection of saline in the uterine cavity through the cervix by a special cannula while doing vaginal ultrasound. The contrast done by fluid injection allows visualization of small uterine polypi not visualized by ordinary vaginal ultrasound.
- ***Dilatation and curettage:*** could diagnose T.B. or Asherman syndrome (no endometrium, only fibrous tissue).
- ***Hysteroscopy:*** The most accurate method to diagnose Asherman syndrome and small fibroid polyp.
- ***HSG:*** It could demonstrate multiple filling defects in Asherman syndrome or fibroid uterus.

D) Detection of cervical factor of infertility

History:

- Previous operation on the cervix as amputation or cauterization.
- Chronic cervicitis as mucopurulent discharge, contact bleeding and backache.

Examination: To detect chronic cervicitis, cervical polyp.

Specific investigations:

- ***Evaluation of cervical mucus :***
  - This is done **at time of ovulation** (best quality of cervical mucus) to avoid false results.
  - The following items should be detected :

    a. Volume.
    b. Viscosity.
    c. Thread (Spinbarkiet) test.
    d. Ferning test.
    e. Cellularity.
- ***Post coital test:*** Its value is of marked debate.

Precautions:

- It must be done **at time of ovulation**.
- It should be preceded by semen analysis.
- No intercourse for 2-5 days prior to the test.
- No lubricants are used during the intercourse and no post coital douches.
- Patient is examined 2-8 hours after intercourse (average 4 hours).
- Microscopic ex. for living sperms in discharge.

Results:

- The presence of more than 5 progressively motile sperms/high power fields in the cervical mucus indicates good test, however, false results are very common.

- **Bacteriological examination for infection or detection of antibodies** in cervical mucus (IgA).

E) *Detection of vaginal factor of infertility*:

History:

- Vaginitis (discharge, pruritus vulvae).
- Vaginal septum (cryptomenorrhea).

Examination: will detect the cause.

F) *Detection of general disease*:

History and examination:

Could reveal hypertension, renal disease, heart disease or other general disease.

Specific investigations:

According to the case to detect any general disease e.g. D.M. or renal impairment.

Treatment of Female Infertility

Ovarian factor:

- Anovulation: induction of ovulation (see later).
- Luteal phase defect :
    - Natural progesterone orally, vaginally, or I.M. in the 2nd half of the cycle (2-3 days after ovulation for 10 days). If pregnancy occurs, ttt should continue till the end of 1st trimester (the placenta will produce progesterone instead of corpus luteum).

Tubal factor:

- **Surgical ttt:**

Tuboplasty could be done to restore their patency mainly by laparoscopy or rarely by open laparotomy. If tubes show hydro or pyosalpinx, it is preferable to do *laparoscopic tubal disconnection or ligation* to improve the results of subsequent I.V.F.

- **In vitro fertilization and embryo transfer (I.V.F. and E.T):** (See assisted reproductive techniques):

Uterine factor:

According to the cause e.g.:

- Hysteroscopic lyses of adhesions or hysteroscopic excision of uterine septum.
- Myomectomy in some cases as submucous myomas or those distorting the cavity. This could be done by open laparotomy or by operative hysteroscopy.
- Open myomectomy is associated with increased peritubal adhesions while hysteroscopic myomectomy needs specific surgical skills.

Cervical factor:

According to the cause e.g.:

- Cervical infections: antibiotics and cauterization of cervix. Small doses of estrogen could be given in the 1st half of cycle to improve quality of cervical secretions.
- Sperm antibodies: Artificial insemination husband (A.I.H or I.U.I) could be done using 0.2 – 0.3 mL of specially prepared husband semen injected directly in uterus using a special catheter.
- I.V.F. could be done in resistant cases.

Vaginal factor:

According to the cause e.g. ttt of vaginitis.

General factors:

- Treatment of any general disease as D.M., or any endocrinological disease as obesity or thyroid dysfunction.
- Proper counseling for sexual troubles and to practice sexual relation at time of ovulation

Unexplained infertility:

- All investigations must be revised to detect any hidden cause.
- Laparoscopy must be done for evaluation and to detect any hidden pathology as mild endometriosis.
- Artificial insemination could be tried for several months or I.V.F should be done.

Assisted Reproductive techniques

Procedures that involve ovum retrieval e.g. I.V.F., I.C.S.I., testicular sperm aspiration followed by I.C.S.I.

Indications:

- Tubal factor of infertility with bilateral tubal damage which is not suitable for laparoscopic tuboplasty.
- Severe endometriosis.
- Male factor as severe oligospermia. Asthenospermia, necrospermia, or azospermia with presence of living sperms in testicular biopsy.
- Sperm antibodies.
- Unexplained infertility after revising all previous investigations including laparoscopy. I.U.I could be tried for 3 cycles in these cases prior I.V.F. especially if patient is relatively young age.
- Selection of fetal sex to avoid sex linked congenital diseases and to be able to exclude congenital anomalies in fertilized embryo before embryo transfer. Selection of sex for social reasons has many medico legal criticisms.

Principle:

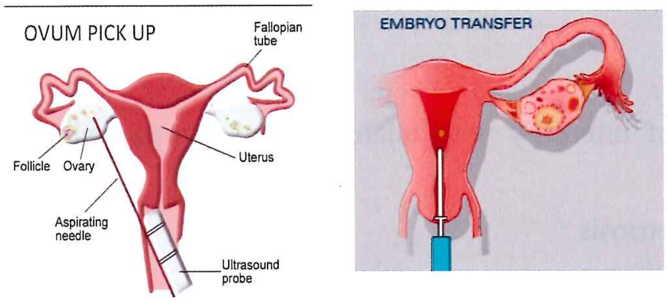
- Initial counseling with both partners to explain indications, technique, success rate, expenses, possible side effects.
- Many protocols could be used, the most common is long protocol with pituitary down regulation starting from mid luteal phase using GnRh analogue. This is followed by induction of multiple ovulations by H.M.G. Starting from 2nd or 3rd day in the following cycle. When multiple follicles are mature, H.C.G is given and oocyte retrieval by vaginal ultrasound under anesthesia 36 hours later.
- Sperms are either incubated with retrieved ova in specific culture media or better injected into cytoplasm of ova under microscope (I.C.S.I)
- Embryos (usually 2) are transferred into uterine cavity by a special catheter 2, 3 or 5 days after.
- Luteal phase support by progesterone till pregnancy test is done.

Success Rate:

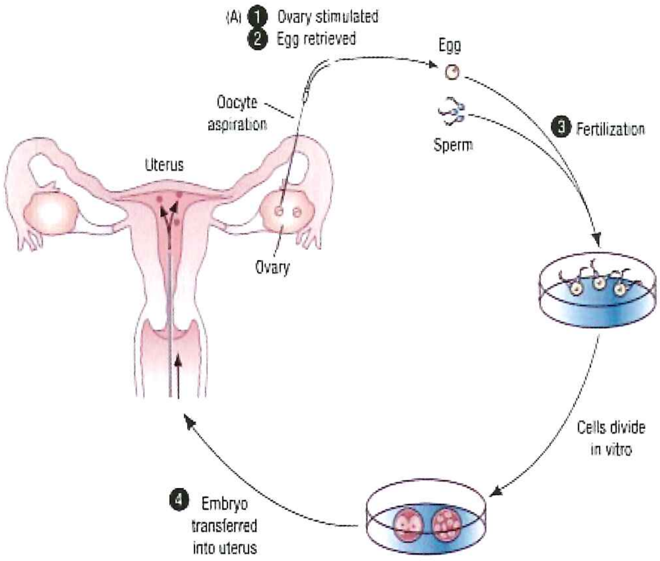
- Success rate increase with decreased maternal age. High F.S.H. levels are associated with poor response. Other tests to detect ovarian reserve as AMH is done.
- Presence of hydrosalpinx decreases the success rate. Laparoscopic tubal disconnection or tubal ligation should be done 1st.
- Presence of uterine pathology as submucous uterine polyp, large intramural fibroids more than 3cm, uterine septum should be managed 1st.
- According to various repots success rate is about 35 to 50%.

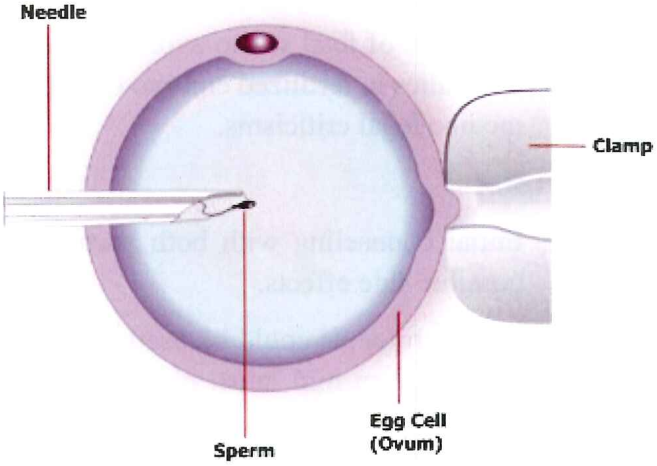
Complications:

- OHSS (Ovarian hyperstimulation syndrome): see before.
- Ovum retrieval complications as anesthesia complications, injury of pelvic vessels or infection.
- Higher incidence of abortion, multiple pregnancy or ectopic pregnancy.
- Psychological frustration in failed cases.


OVUM PICK UP
Fallopian tube
Follicle
Ovary
Uterus
Aspirating needle
Ultrasound probe
EMBRYO TRANSFER

IVF-ET


(A) 1 Ovary stimulated
2 Egg retrieved
Egg
Oocyte aspiration
Sperm
3 Fertilization
Uterus
Ovary
Cells divide in vitro
4 Embryo transferred into uterus


Needle
Clamp
Sperm
Egg Cell (Ovum)

ICSI

Sexual Disorders

(1) Dyspareunia

Definition: Painful or difficult intercourse.

Types:

A) 1ry Dyspareunia:

It dates from 1st intercourse.

Etiology:

- Aplasia or hypoplasia of the vagina.
- Tough and rigid hymen.
- Infected defloration injuries.
- Vaginismus.

B) 2ry Dyspareunia:

It occurs after a period of painless coitus.

Etiology:

- **Superficial dyspareunia:** (Pain during penetration).
- Vulval lesions as vulvitis, bartholinitis, bartholin cyst or abscess, vulval tumor or urethral caruncle.
- Vaginal lesions as acute vaginitis, and tender scar of perineorrhaphy or vaginal tumors.
- Extra-genital lesions as piles or anal fissure.
- **Deep dysparunia** : (Pain after penetration)
- Chronic cervicitis, chronic salpingeoophoritis, retroverted uterus (ovaries are prolapsed in Douglas pouch) or endometriosis especially with involvement of recto-vag. septum.
- Extra genital lesions as colitis or diverticulitis.

Treatment: Treat the cause.

(II) Vaginismus

It is violent reflex spasm of the levator ani, perineal muscles, gluteal muscles and adductors of the thigh on any attempt at sexual intercourse.

1ry	2ry
It is psychological.	It is due to dyspareunia with painful lesions in the vulva or vagina

Treatment: That of the cause

(III) Frigidity

It is lack of sexual desire (loss of libido)

It may be due to:

- Psychological.
- Sexual disharmony (failure to achieve orgasm).
- Female genital mutilation (FGM).
- 2ry to dyspareunia.

Treatment: That of the cause. Small doses of androgen may be given to increase sensitivity of clitoris.

Contraception
(Family Planning)

Indications:

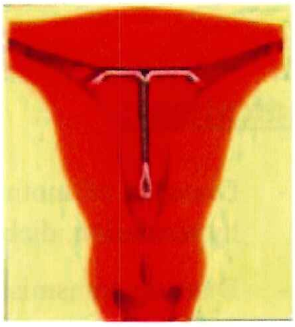
- Diseases of mother, worsened by pregnancy e.g. advanced heart disease, renal disease, severe hypertension, diabetes or mental illness.
- Diseases transmissible to fetus as congenital anomalies, mongolism and others.
- Repeated C.S.
- Social reasons.

Methods:

1. ***Physiological methods*** :
    - Coitus interruptus.
    - Safe period.
    - Prolonged lactation.
2. ***Chemical methods.***
3. ***Mechanical methods :***
    - Condom.
    - Vaginal diaphragm.
    - Cervical cap.
4. ***Intrauterine contraceptive device.***
5. ***Hormonal methods:***
    - Oral contraceptive pills.
    - Injectable contraceptives.
    - Contraceptive implants.
    - Transdermal patches.
    - Vaginal ring.
6. ***Surgical methods (sterilization).***

Intrauterine Contraceptive Devices (IUCD)

Types:



1) Non medicated loops:

Obsolete e.g. lippes loop. They could be left till menopause.

2) Copper loops:

- Copper devices (copper T, copper 7, multiload copper). They should be changed every 7 years as copper will be fragmented.
- Nova T is a modified copper device, covered with silver to prevent fragmentation (left for 10 years).

3) Medicated loops:

- Levonorgestrel released device (LNG- IUS) e.g. Mirena, It releases progesterone daily. It must be changed every 3-5 year.
- It is the only device which is not associated with excess blood loss during menstruation.

Mode of action:

- Histological and histochemical changes in the endometrium making it hostile for implantation.
- Attract macrophages which phagocytes the sperms and the fertilized ovum.
- Increases local production of prostaglandins with increased tubal and uterine motility.
- Copper is ionized inside the uterus and these ions interfere with carbonic anhydrase and alkaline phosphatase enzymes necessary for implantation.
- Synthetic progesterone makes the endometrium unsuitable for implantation i.e. hostile endometrium.

Advantages of Loop:

- Cheap, reliable.
- One decision method, used in national programs in developing countries.
- Does not affect fertility or lactation.

Side Effects:

- ***Bleeding*** :

  Post insertion bleeding, menorrhagia or metrorrhagia. This is seen in copper devices.

  Treatment:

  - Anti-prostaglandins as mefenamic acid and antifibrinolytics as epsilon amino caproic acid.
  - Vit. C and Vit. K.
  - Exclude other causes of bleeding by proper ex., vaginal smear and curettage if necessary especially if metrorrhagia occurred after long period after insertion.
  - If bleeding persisted, change or remove the loop.

- ***Pain:***

  Causes:

  - During insertion pain and syncope may occur (may be also due to perforation).
  - Colic may occur in 1st month, usually resolve spontaneously. Later on, may be due to starting expulsion of the loop or disparity between size of the loop and size of the uterus or abnormal position.
  - Congestive dysmenorrhea or backache may occur.
  - Pain may denote pelvic infection.

  Treatment:

  Analgesics. If persistent or severe, remove the device.

- ***Pelvic Infection:***

  Acute P.I.D, This is due to disturbed cervical mucus plug by threads of I.U.D

  ttt: Antibiotics and remove the device if persists.

- ***Vaginal discharge*** :

  - Slight serous, mucoid or serosanguineous may occur after insertion.
  - Purulent offensive discharge indicates infection.

- ***Pregnancy (<0.5/H.W.Y.)***

  - Mostly due to improper placement in cervical canal or low done in the uterine cavity.
  - The commonest pregnancy to occur with I.U.D is ectopic pregnancy.
  - Management of intrauterine pregnancy on top of I.U.D. :
    - If the threads are visible, remove the loop (25% incidence of abortion).
    - If the threads are not visible, leave the loop in place and observe (50% incidence of abortion, most are septic).

- ***Spontaneous expulsion***:

  Most of cases occur during menstruation.

  Perforation of the uterus.

  - Occurs only during insertion.
  - It might present immediately by pain, syncope and vaginal bleeding or may be later on with inability to feel the thread or by being pregnant.
  - Ultrasound will reveal empty uterus. While X-ray pelvis and abdomen will show radio-opaque I.U.D shadow.

Telegram: @AUDataa_bot

- *Treatment* :
  - If discovered during insertion: Observe vital signs. Rarely if patient is deteriorating, laparotomy should be done immediately.
  - If discovered later on, devices should be removed by laparoscopy or laparotomy as peritoneal irritation and adhesions may occur. This can result in intestinal obstruction.
- ***Difficult removal***:

  Causes:
  - If the threads are cut.
  - The device may be embedded in the endometrium with bridges across the device.
  - The device may break during removal.

  Treatment: Hysteroscopic removal or removal under anesthesia after dilatation of the cervix.

Missed Loop

Definition: Inability to feel the nylon threads of the loop.

Etiology:

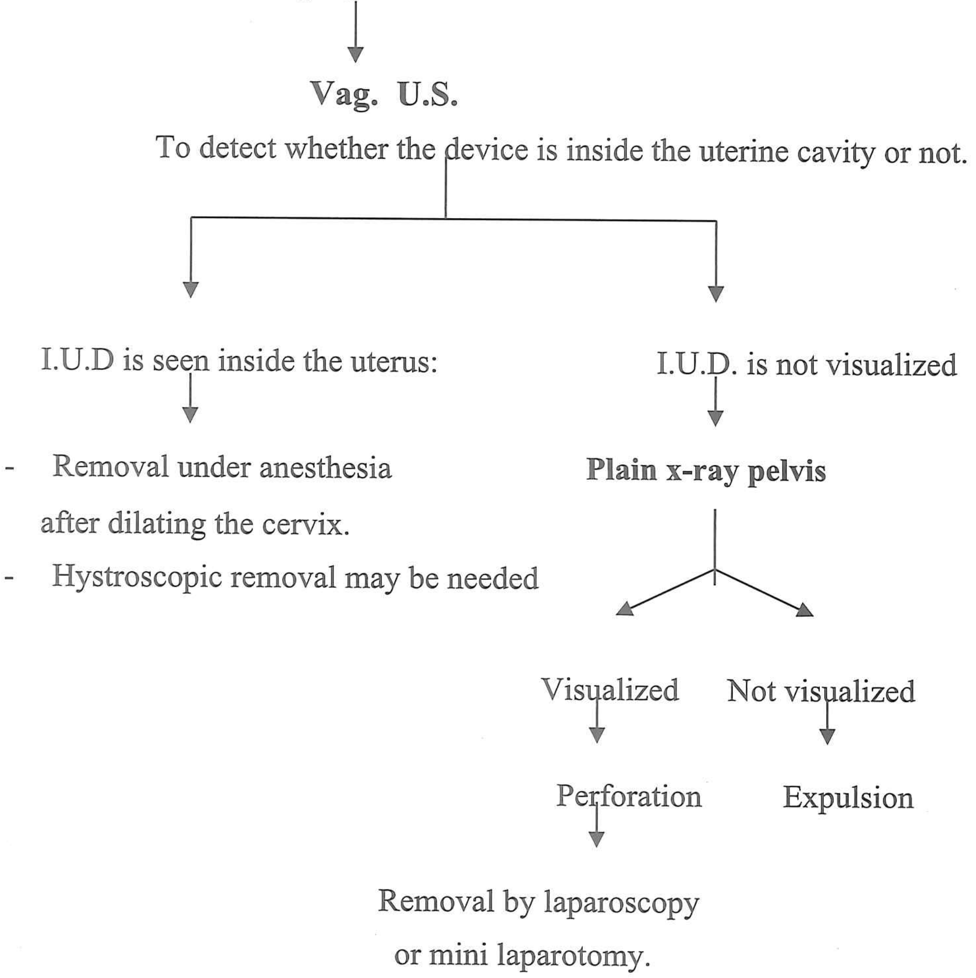
- *The nylon threads*:
  - Adherent to vaginal vault by viscid discharge.
  - Cut or retracted into cervical canal or the uterus.
- *The loop* :
  - Perforation of uterus.
  - Spontaneous expulsion.
- *Pregnancy*.
- *Deep vagina and short fingers*.

Management:

Exclude pregnancy.

(History talking, bimanual ex., pregnancy test or U.S):

- ○ *Pregnant:* (See before).
- ○ *Not pregnant :*



Vag. U.S.

To detect whether the device is inside the uterine cavity or not.

I.U.D is seen inside the uterus:

- Removal under anesthesia after dilating the cervix.
- Hystroscopic removal may be needed

I.U.D. is not visualized

Plain x-ray pelvis

Visualized

Perforation

Removal by laparoscopy or mini laparotomy.

Not visualized

Expulsion

Contraindications of I.U.D:

- Menstrual irregularities as menorrhagia or metrorrhagia.
- Suspect of malignancy.
- Present or past history of pelvic infection or recent septic abortion.
- Suspect of pregnancy or greater liability for pregnancy with the device e.g. uterine anomalies (septate or bicornuate), uterine fibroid with large uterine cavity.
- Previous ectopic pregnancy.

Time of insertion:

- Post menstrual to exclude pregnancy and also easier introduction (may be in last day of menstruation).
- At the end of puerperium or 1 – 2 weeks after abortion.

Technique of insertion:

- Bimanual ex. to detect size and direction of the uterus.

- The cervix is exposed by Cusco speculum, and the ant. lip is grasped by a Volsellum.
- Length and direction of uterus is detected by a sound.
- The loop and introducer are supplied in a sterilized package.

Withdrawal technique: (copper and LNG- IUS).

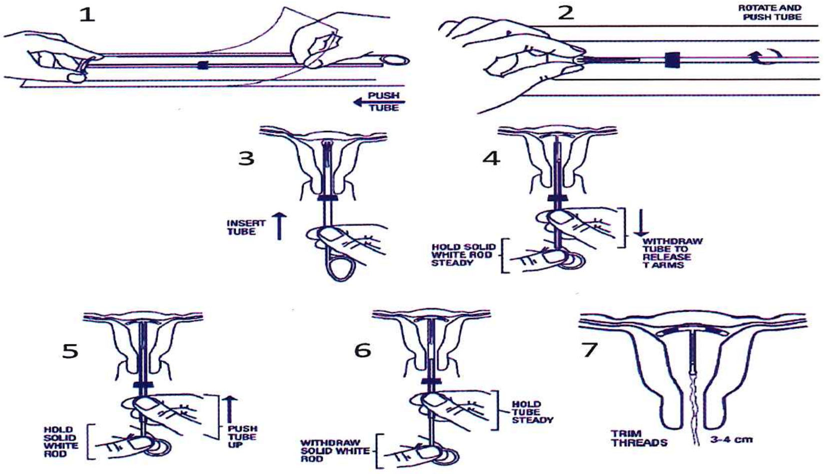
- The introducer (with the loop inside) is introduced in the uterus up to the fundus.
- The plunger is passed into the introducer until it reaches the lower end of the loop.
- The plunger is fixed in place and the introducing tube is withdrawn downwards (the device will be extruded into the uterine cavity).

Post insertion instructions:

- Uterine colic, spotting, serous or mucoid discharge may occur for some times.
- The 1st one or 2 cycles may be heavier than normal.
- The patient should feel the nylon threads particularly after menstruation.
- She should attend for check up after one month then annually.

Non contraceptive use of I.U.D.:

- It was previously used after ttt of Asherman syndrome to prevent reformation of adhesions between ant. and post. wall.
- Mirena (LNG- IUD) could be used to treat dysfunctional uterine bleeding.


1
2
ROTATE AND PUSH TUBE
PUSH TUBE
3
INSERT TUBE
4
HOLD SOLID WHITE ROD STEADY
WITHDRAW TUBE TO RELEASE T ARMS
5
HOLD SOLID WHITE ROD
PUSH TUBE UP
6
WITHDRAW SOLID WHITE ROD
HOLD TUBE STEADY
7
TRIM THREADS
3-4 cm

IUD insertion

Oral Contraceptive Pills (O.C.P)

Types:

Combined pills:

The most effective almost without failure.

Every pill contains estrogen and progestagen which are taken regularly for 21 days followed by 7 days rest.

Progesterone only pills (minipills):

- Very small dose of progestagen alone is administered continuously irrespective of menstruation and must be at the same time every day.
- Ovulation inhibition occurs only in 20% of cases (mode of action … see later).
- There is higher incidence of menstrual irregularities, but other side effects (due to estrogen) are not present.

It is the only type of pills that does not affect lactation so can be used in lactating females but many refuse this due to its strict time precautions.

Mode of action of pills:

- Suppression of ovulation (-ve feedback on hypothalamus and pituitary gland). This could be achieved by estrogen only but the addition of progestagens help in :
  - Better control of cycle (estrogen withdrawal bleeding is prolonged whilst estrogen and progesterone withdrawal bleeding simulates normal menstruation).
  - Progestagens prevent endometrial hyperplasia and carcinoma.
  - Progestagens have a contraceptive effect.
- Progestagens cause some changes in motility of fallopian tube (prevent fertilization).
- Progestagens produce hostile endometrium in the form incomplete secretory changes with exhaustion atrophy of glands and marked stroma edema.
- Progestagens change the character of cervical mucus to be hostile to sperms.

Advantages of pills:

- Combined method is the most reliable (theoretical efficiency is 100% but use efficiency has an incidence of 0.1 to 1 per H.W.Y. failure due to irregular intake).
- No permanent interference with fertility.
- No interference with coitus.
- Combined pills decrease the incidence of non-neoplastic and neoplastic ovarian cysts, endometriosis and endometrial carcinoma.
- Combined pills normalize the previously irregular cycles.

Side effects:

I] Side effects causing discomfort to users:

- *Nausea and rarely vomiting:* Usually regress after the 1st few cycles. If persisted, change to other pills with lower dose.
- *Headache, irritability* and depression (due to progesterone effect) : If persisted, change to other type with lower dose.
- *Decreased libido:* Usually due to the cosmetic changes.

II] Anticosmetic effects:

- Some increase in body weight due to salt and water retention and anabolic effect.
- Some hair loss may occur.

- Skin pigmentation resembling chloasma of pregnancy.
- Corneal irritability in contact lenses users (due to edema).
- Acne may occur (progesterone effect).
- Breast engorgement, tenderness, and enlargement.

III] Menstrual changes:

- Amenorrhea :
  - During the period of pill use, if withdrawal bleeding failed to occur, pregnancy is highly suspected.
  - In 1% of cases of prolonged pill use amenorrhea may persist after pill stoppage (post pill amenorrhea).
- Spotting (few drops of blood during intake of pills) or break through bleeding (more than drops): Other pills with higher doses should be used.

IV] Impairment of metabolism and body functions:

- *Thromboembolism:* due to estrogen effect on blood chemistry causing increased adhesiveness of platelets, increased fibrinogen, factors VII, X and decreased antithrombin III.
- *Cardiovascular diseases:* and hyperlipidemia.
- Some impairment of carbohydrate metabolism may occur (due to estrogen and progestogen effect). Diabetes may appear in predisposed women or become difficult to be controlled in diabetic cases.
- Some increase in blood pressure may occur due to salt and water retention.
- Some impairment of liver functions and increased incidence of gall bladder stones may occur due to estrogen and progesterone effect.
- Decreased milk production in lactating female due to estrogen effect. Progesterone only pills have no effect on lactation.

Contraindications of combined contraceptive pills:

Absolute:

- History of thromboembolization or cerebro vascular accident.
- Impaired liver function.
- Breast tumor (benign or malignant)
- Coronary heart diseases.
- Pregnancy (known or suspected).
- Undiagnosed genital bleeding.

Relative:

- Elective surgery (4 weeks before).
- Age > 35 years especially if smoker.

- Diabetes.
- Hypertension.
- Vascular headache as migraine.
- Smoking.
- Varicose veins.

N.B. : Non contraceptive benefits & other uses of O.C.P.

- Treatment of dysfunctional uterine bleeding, spasmodic dysmenorrhea endometriosis (continuous intake), or functional follicular cysts of ovary.
- To postpone menstruation.
- Less incidence of P.I.D, endometrial carcinoma, non-neoplastic cysts of ovary and epithelial ovarian cancer.

☛ Some clinical considerations in the use of O.C.P.:

- Full history, examination should be done initially and repeated every year.
- In cases of lack of absorption due to vomiting or diarrhea, the patient should use an additional method of contraception e.g. condom by the husband till the end of this cycle.
- If one pill is missed, it should be taken as soon as remembered and the next pill is taken in time. If 2 pills are missed, they are taken as soon as remembered and take the next in time. If more than 2 tablets are missed, discontinue the tablets till onset of withdrawal bleeding and use another method of contraception until the next package is used from the 5th day of bleeding.
- Combined pills are taken for 21 days starting form 5th day of menstruation followed by 1 week rest and is repeated so long withdrawal bleeding occurred during this week.

  Progesterone only pills are taken continuously without rest.
- Many drugs may interfere with the efficiency of pills e.g.
  - Anticonvulsants, hypnotics, tranquilizers.
  - Antibiotics as rifampicin, tetracycline.

Injectable contraceptives

***- Progestin only injections*:**

It acts by suppressing hypothalmo-pituitary ovarian axis to inhibit ovulation. It also induces endometrial and cervical mucus changes. Medroxy progesterone acetate in a depot form (depot provera) 150mg IM every 3 months.

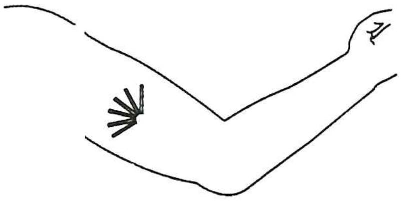
Advantages: Effective, can be used during lactation, not taken daily.

Disadvantages: Higher incidence of menstrual irregularities and some delay in return of fertility (about 9 months).

***- Combined injections*:** used monthly, same contraindications as combined pills.

Sub dermal implants

It releases progestogen slowly over 3-5 years. The same disadvantages as injectable contraceptives. Implants are effective for 5 years.



Subdermal implant

Physiologic methods of contraception

- ***Safe period*** (rhythm period) could be used only in women with regular cycles. The women better record her basal body temperature chart for few cycles to detect time of ovulation.

  Unprotected intercourse is allowed before day 10 and after day 19 of start of menstrual cycle. The idea for this is based on fact that at midcycle released oocyte can survive for only 1 day while male sperm may live for about 3 days.

  It is unreliable method especially if cycles are irregular.

- ***Prolonged lactation**:* Lactation causes variable periods of anovulation and amenorrhea. This is unreliable method as this period of anovulation is very variable and also ovulation occurs before menstruation so, the patient may become pregnant and think that amenorrhea is due to lactation.
- *Coitus interruptus:* Withdrawal of the male organ just before ejaculation. It is unphysiologic and unreliable.

Chemical Methods

The use of spermicidal drugs as nonoxynol in the form of creams, pessaries, foaming tablets to kill spermatozoa deposited in vagina. They are introduced 15 minutes before intercourse. If another intercourse is done, another tablet is used. They are used usually in association with other mechanical methods and in emergencies as rupture condom.

They are unreliable and may cause vaginal and cervical irritation.

Mechanical Barrier Methods

- **Condom:**

Formed of latex rubber, lubricated with spermicidal.

Advantages and non-contraceptive uses of condom:

- No systemic side effects.
- No effect on lactation on future fertility.
- Reliable with failure < 10 H.W.Y.
- Prevents sexually transmitted diseases.

- It could improve premature ejaculation and it might help to maintain erection.
- Could be used in cases with cervical antibodies (see infertility).

Disadvantages:

- Interferes with the pleasure of the act to the male.
- It might increase erectile difficulties.
- Tear of condoms may occur.

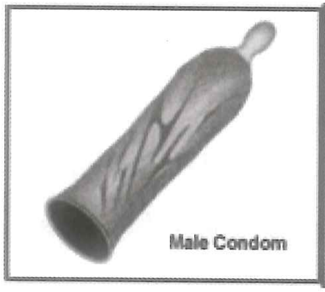
N.B.: Female latex condom is available & effective as male condom

- **Vaginal diaphragm (Dutch cap):**

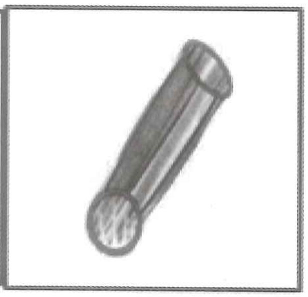
It is a round rubber diaphragm with a thick rim containing a metal spring. It is intended to lie obliquely in the vagina extending from post. fornix to symphysis pubis so, isolating the cervix from semen pool in vagina. It is better to be lubricated with spermicidal before use and to be left in vagina for 1/2 hour after intercourse. It is not commonly used due to difficult application.

Cervical Cap:

Small dome-shaped cap fitted directly on cervix, where it is retained by suction. It is used when there is prolapse as the patient can apply the cap.



Male condom



Vaginal diaphragm

Spermicide
Nonoxynol-9

Spermicide cream

Surgical methods of contraception

- *Female sterilization*: Ligation, excision, cauterization of the tubes or application of polyethene clips could be done either by laparoscopy, mini laparotomy, during C.S or by hysteroscopy where cauterization of tubal ostia could be done. This permanent method of contraception should be used only when is there is absolute contraindication for pregnancy e.g. advanced heart diseases. Chronic pelvic congestion (chronic pelvic pain – menorrhagia) & some psychological changes may occur after (*post ligation syndrome*).

- *Male sterilization*: Bilateral ligation and excision of the vas deference done under local anasthesia.

Tubal ligation

N.B. :

■ Contraception in lactating women :

High level of prolactin inhibits gonadotropin secretion so it suppresses ovulation. Period of suppression is variable and depends on rate of lactation.

It is unreliable method of contraception.

Possible methods:

1. *I.U.D.*
2. *Progesterone only pills (minipills) :* while Combined pills should not be taken as they decrease milk production and also excreted in milk.
3. *Injectables as depot medroxy progesterone acetate* (depot provera) 150mg Im every 3 months.
4. *Barrier methods as condom*: Not accepted by many couples.
5. *Chemical methods:* High failure rate and possible allergy to male or female.
6. *Female sterilization:* Could be used during C.S or by laparoscopy if there is a permanent need for contraception e.g. advanced heart disease.

■ Post coital contraception (emergency contraception) :

Indications:

- Tear or slipping of the condom.
- Unprotected intercourse in the safe period.
- Rape.

Methods:

- 4 tablets of O.C.P. (combined form) within 72 hours and another 4 tablets after 12 hours. They either suppress ovulation if not occurred yet or make the endometrium hostile for implantation.
- Large dose of progestagens as levo norgestrel 0.4mg within 72 hours.
- Insert I.U.D. within the 1st 5 days.

Diseases of the vulva

Vulvitis and Pruritus vulvae :

Aetiology:

- **Associated with vaginal discharge (80%).**

  Bacterial vaginosis, Monilia & trichomonas are the commonest.

- **Not associated with vaginal discharge (20%)**

  - General diseases as D.M., obstructive jaundice, uremia.
  - Allergy e.g due to soaps or antiseptics.
  - Skin disease as scabies, tinea.
  - 2ry to urinary disorders as glycosuria, urinary incontinence or rectal disorders as oxyurius, complete perineal tear.
  - Chronic epithelial dystrophies or cancer vulva (old age).
  - Idiopathic or psychologic.

Investigations:

- ***History :***
  - Associate discharge with its character.
  - Exposure to irritant as soaps, deodrants.
  - General disease.
  - Old age : Malignancy is suspected.
- ***Examination :***
  - Evidence of general disease e.g jaundice.
  - Severity of condition is assessed by scratch marks and hyperemia. Inguinal L.N should be palpated.
  - Evidence of local lesion as associated discharge, vulval skin disease, dystrophy or malignant ulcer.
- ***Specific investigations :***

  According to clinical data e.g
  - Blood sugar.
  - Culture of associated discharge
  - Biopsy from suspicious lesion.

Treatment:

- Treatment of cause e.g control diabetes and specific ttt for vaginal infection.
- Local cleanliness, antiseptics and corticosteroid containing creams.

Ulcers of the Vulva

1. **Traumatic ulcer:** Infected perineal tears.
2. **Inflammatory ulcer:**

(I) Sexually-transmitted diseases:

(Syphilis – Chancroid – lymphogranuloma inguinale – granuloma inguinale – herpes genitalis).

a. *Syphilis* :
  - 1^{ry} syphilis (chancer): rounded or serpiginous single ulcer, painless, sharp outlines, necrotic floor, hard base and associated with painless L.N.
  - 2^{ry} syphilis: Mucous patches or condyloma lata.
  - 3^{ry} syphilis: Large ulcer due to breaking of gumma.

b. *Chancroid* : Hemophillus Ducrey's bacilli-multiple, painful, soft, shallow ulcers with painful L.N.

c. *Lymphogranuloma inguinale* : Chlamydia trachomatis. Ulcer associated with lymphatic obstruction and elephantiasis.

d. *Granuloma inguinale* : Donovania granulomatis which form characteristic Donovan bodies.

e. *Herpes genitalis*: Viral infection, multiple small, shallow painful.

f. *HPV warts*: condyloma accuminata, pailness

(II) T.B. ulcer: Single or multiple, painful, serpiginous outline, undermined edges.

3. **Malignant ulcer:**
   - Carcinoma: raised everted edges, deep hard base associated with firm or hard L.N.
   - Rodent ulcer (basal cell carcinoma): Locally malignant ulcer which progress by an advancing hard edge (No lymphatic or bl. born spread).

Swellings of the Vulva

1. Congenital:

- Hypertrophy of clitoris or hypertrophy of labia minora.
- Clitoridal cyst.
- Congenital dermoid cyst in midline only.

2. Traumatic:

- Hematoma e.g. after labor.

3. Inflammatory:

- Vulvitis, Bartholin abscess, hypertrophic T.B, condyloma lata, condyloma acuminata.

4. Neoplastic:

- *Benign*: Fibroma, lipoma, papilloma.
- *Malignant*: 1ry carcinoma or metastatic tumors.

5. Others:

- *Circulatory disorders*: varicose veins (e.g. during pregnancy), edema & elephantiasis.
- *Retention cysts*: (Bartholin gland disorders – inclusion dermoid cyst – sebaceous cyst – endometrioma – hydrocele of canal of Nuck).

Bartholin gland disorders:

Bartholin gland is located in lower part of labia majora. The duct opens in the vestibule close to hymenal orifice. It secretes mucus to lubricate the vulva at time of sexual intercourse.

Bartholinitis:

It is acute infection, mostly gonococcal or pyogenic (staph. and stept.)

Clinically: Local pain and tender swelling in the post part of labia majora with red hot edematous skin cover.

Treatment: Antibiotics and cold water fomentations. Recurrence is common. **Abscess** may occur with formation of fluctuant swelling full of pus. It may evacuate spontaneously through a sinus but recurrence is the role. This should be properly drained by a longitudinal incision outside the vagina.

Bartholin cyst:

- It is the commonest vulval swelling.
- In most cases it is a cyst of the duct (not the gland), full of mucoid material and lined with transitional epithelium.
- It is a sequel of Bartholinitis with fibrosis & occlusion of the duct. Minor trauma as repeated cycling or surgical trauma by episiotomy may be predisposing factors.
- **Clinically** : cystic swelling of variable size in post wall of labia majora. 2ry infection and abscess formation commonly follow.
- **Treatment** : Marsupialization (deroofing): less blood loss, short convalescence and preserve gland function.

Inclusion dermoid cyst:

Small cyst arises from embryonic remnants or from inclusion of a particle of epithelium beneath the surface during repair of episiotomy, perineal tear, or at site of circumcision (clitoridal cyst).

Sebaceous cyst:

- Small, multiple cysts due to occlusion of ducts of sebaceous glands. They are characterized by presence of punctum.

Endometrioma:

- Small bluish cyst which enlarge in size & becomes painful with menstruation. Other manifestations of endometriosis as dysmenorrhea infertility may be present.

Hydrocele of canal of Nuck:

Canal of Nuck is a peritoneal pouch which accompanies the round ligament during development. This pouch is normally obliterated. Hydrocele is a cystic collection of serous fluid in no obliterated pouch.

- *Clinically*: Elongated translucent swelling in upper part of labia majora that may extend to inguinal canal and may empty by pressure (if it communicates with the peritoneal cavity).
- *ttt*: Excision of the sac and dealing with any associated inguinal hernia if present.

EPITHELIAL DISORDERS OF THE VULVA

A variety of terms have been applied to disorders of the vulvar epithelium that produce a number of non-specific gross changes. The term vulvar dystrophy has been replaced by the classifi- cation proposed by the international society for the study of vulvar disease (ISSVD)

The Terminology Committee presented a new classification of the benign,non-infectious vulvar dermatoses

The table below summarizes the most recent terminology changes *(2014)*

ISSVD 1986	ISSVD 2004	LAST 2012
VIN 1	Flat condyloma or HPV effect	LSIL
VIN 2	VIN, usual type a.VIN, warty type b.VIN, basaloid typec.VIN, mixed (warty/basaloid) type	HSIL
VIN3		
Differentiated VIN	VIN, differentiated type	

NON-NEOPLASTIC EPITHELIAL DISORDERS OF THE VULVA

LICHEN SCLEROSUS ET ATROPHICUS:

Incidence: This is the commonest condition found in the elderly women complaining of vulval itching but may also be seen in children and younger women.

Etiology: The cause is not known but it is associated with autoimmunedisorders.

Symptoms: Itching is prominent or is the main presenting complaint

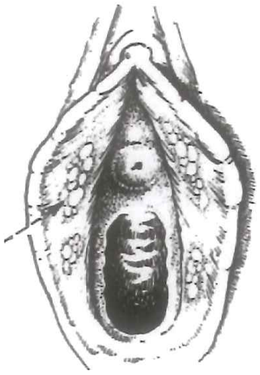
Signs: In early lesions the skin may be reddish, later on it looks thin with a wrinkled surface and white shiny plaques.

Microscopically: there is hyperkeratosis. Lichen sclerosus is often associated with foci of both hyperplastic epithelium and atrophic changes.

Premalignant potential: It is uncertain if lichen sclerosus leads to vulvar cancer

VIN and lichen sclerosus can coexist in the same patient. Approximately 4% of women with lichen sclerosus develop invasive cancer.

Treatment: Topical application of corticosteroid creams or ointment offers the best results.



Vaginal Swellings

1. **Congenital**: Gartner's cyst in the anterolateral wall.
2. **Traumatic**: Hematoma after delivery.
3. **Inflammatory**:
    - Condyloma acuminata: warts in the vagina and vulva.
    - Bilharzial papillomata.
4. **Neoplastic**:

Carcinoma (mainly metastatic, rarely 1^{ry}) :

a. ***Metastatic carcinoma*** :

- Direct extension from cancer cervix, vulva, urethra, bladder or rectum.
- Retrograde lymphatic spread from endometrial carcinoma.
- Retrograde vascular spread from choriocarcinoma.

b. ***1ry carcinoma*** : Rare- old age –. It presents with bleeding, discharge and symptoms of distant metastases. Diagnosis is confirmed by biopsy. Radiotherapy is the ttt of choice.

5. **Others** :

- Endometrioma.
- Urethral diverticulum : Cystic swelling in lower ant. vaginal wall. Pressure on diverticulum leads to discharge of urine or pus from ext. meatus.

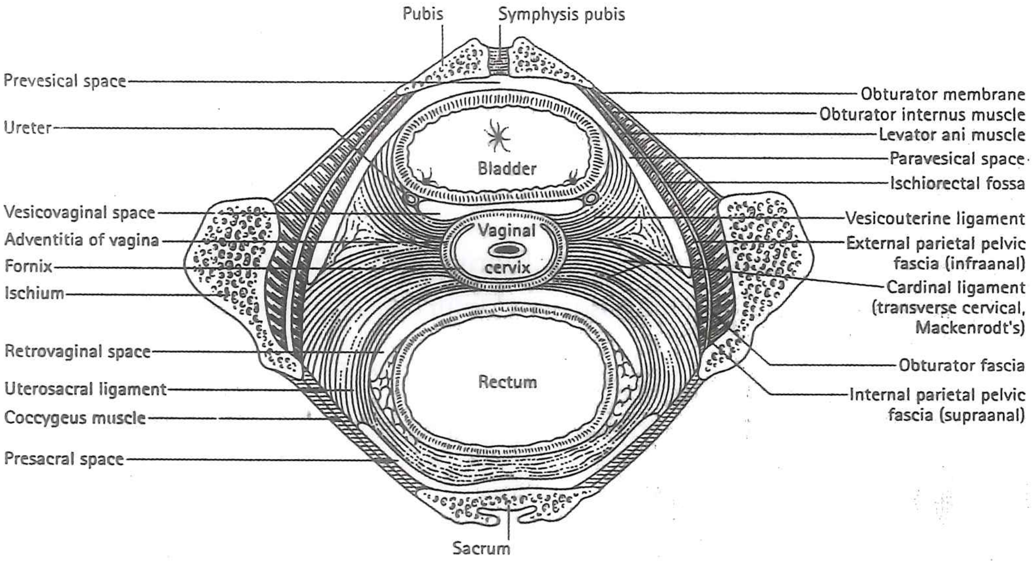
Pelvic Organ Prolapse

Definition:

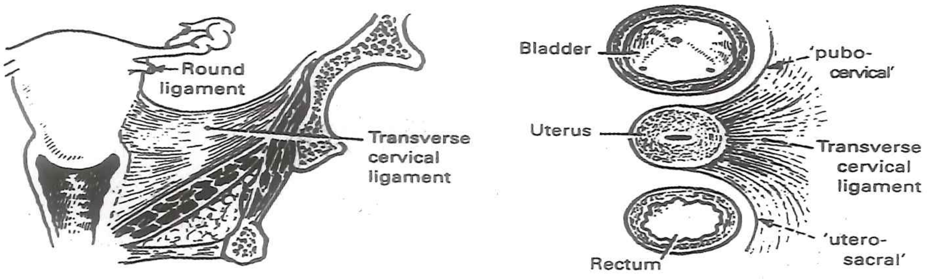
Descent of one or more of the genital organs below their normal position.

Factors that maintain the uterus and vagina in their normal position:

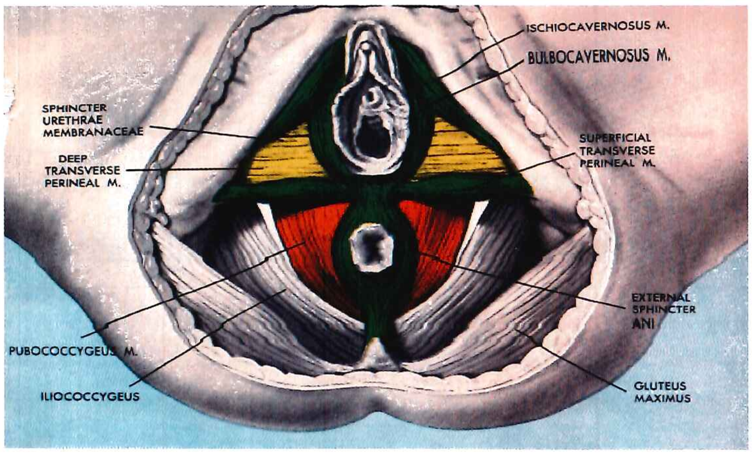
Ligaments	Muscles	Position
3 pairs of cervical lig. which are attached to supravaginal cervix and upper vagina : a. *Mackenrodt's lig.* : They spread in a fan shaped way to be inserted in the lat. pelvic wall (main support). b. *Uterosacral lig.* : They are inserted in the 3rd sacral piece surrounding the rectum. c. *Pubo-cervical lig.* : They are inserted in the back of symphysis pubis, surrounding the uterthra.	The pelvic floor muscles, mainly the levator ani, which is called pelvic diaphragm (main muscular support – see anatomy) and the perineal muscles.	The anteverted position of the uterus as the axis of the uterus is nearly perpendicular to that of vagina.


Pubis
Symphysis pubis
Prevesical space
Ureter
Vesicovaginal space
Adventitia of vagina
Fornix
Ischium
Retrovaginal space
Uterosacral ligament
Coccygeus muscle
Presacral space
Bladder
Vaginal cervix
Rectum
Sacrum
Obturator membrane
Obturator internus muscle
Levator ani muscle
Paravesical space
Ischiorectal fossa
Vesicouterine ligament
External parietal pelvic fascia (infraanal)
Cardinal ligament (transverse cervical, Mackenrodt's)
Obturator fascia
Internal parietal pelvic fascia (supraanal)

The cervical ligaments


Round ligament
Transverse cervical ligament
Bladder
Uterus
Rectum
'pubo-cervical'
Transverse cervical ligament
'utero-sacral'

Attachments of the cervical ligaments


ISCHIOCAVERNOSUS M.
BULBOCAVERNOSUS M.
SPHINCTER URETHRAE MEMBRANACEAE
DEEP TRANSVERSE PERINEAL M.
SUPERFICIAL TRANSVERSE PERINEAL M.
EXTERNAL SPHINCTER ANI
PUBOCOCCYGEUS M.
ILIOCOCCYGEUS
GLUTEUS MAXIMUS

Levators ani muscles

Etiology of prolapse:

Weak support of uterus and vagina e.g. :

a. *Congenital weakness* (rare) leading to virginal or nulliparous prolapse.

b. *Obstetric trauma* (the commonest cause) e.g. :

- Straining in 1st stage of labor.
- Prolonged 2nd stage of labor.
- Forceps application before full cervical dilatation.
- Pressure on the uterus in 3rd stage to deliver the placenta.
- Repeated unspaced deliveries with absence of post natal pelvic floor exercise.

c. *Post-menopausal atrophic changes*.

Precipitating factors:

a. Retroverted position of the uterus: It brings the uterus in the axis of the vagina. This will facilitate descents if there is associated injury to cervical ligaments or pelvic floor muscles.

b. Raised intra-abdominal pressure: e.g. chronic cough or constipation.

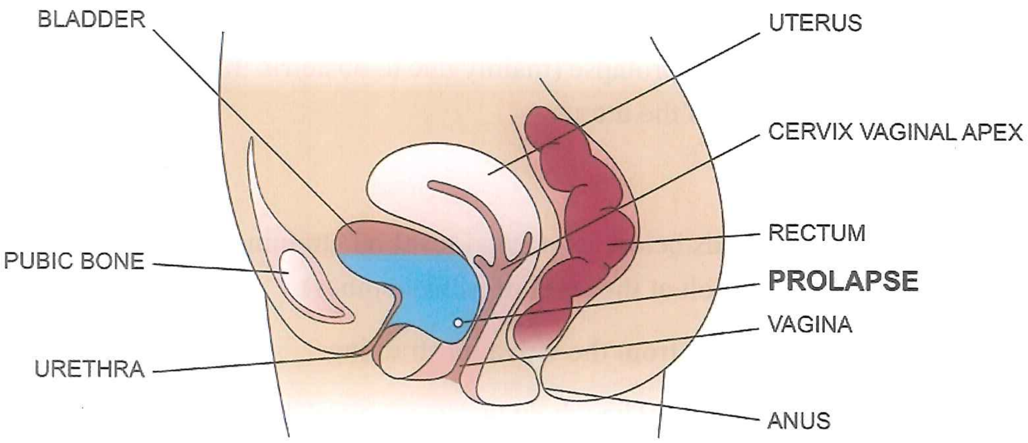
c. Increased weight of the uterus: e.g. early pregnancy or small fibroid.

Types of vaginal prolapse :

[I] Vaginal prolapse:

1. ***Ant. vag. wall prolapse*** :

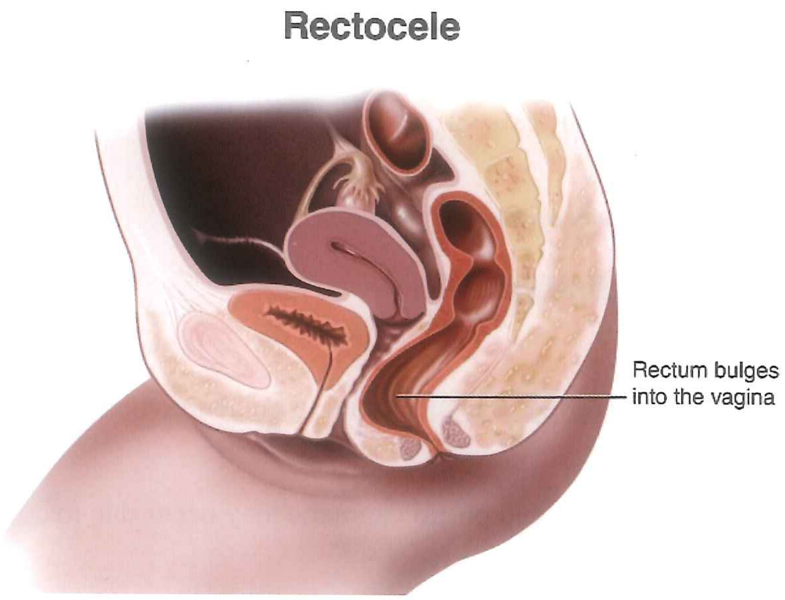
- Prolapse of the upper part with the base of the bladder is called ***cystocele***.
- Prolapse of the lower part with the urethra is called ***urethrocele***.
- Complete ant. vaginal wall prolapse is called ***cystourethrocele***.


BLADDER
UTERUS
CERVIX VAGINAL APEX
RECTUM
PUBIC BONE
PROLAPSE
VAGINA
URETHRA
ANUS

Cystocele

2. ***Post. vag. wall prolapse*** :

   - If the ant. wall of rectum is prolapsed, it is called ***rectocele***.
   - If the peritoneum of Douglas pouch containing intestine is prolapsed from the upper part of the vagina, it is called ***enterocele***.
   - Rectocele and enterocele may occur together.


Rectocele
Rectum bulges into the vagina

3. ***Vault prolapse***:

   Descent of the vaginal vault after hysterectomy.

[II] Uterine prolapse:

a. ***Utero-vaginal*** :

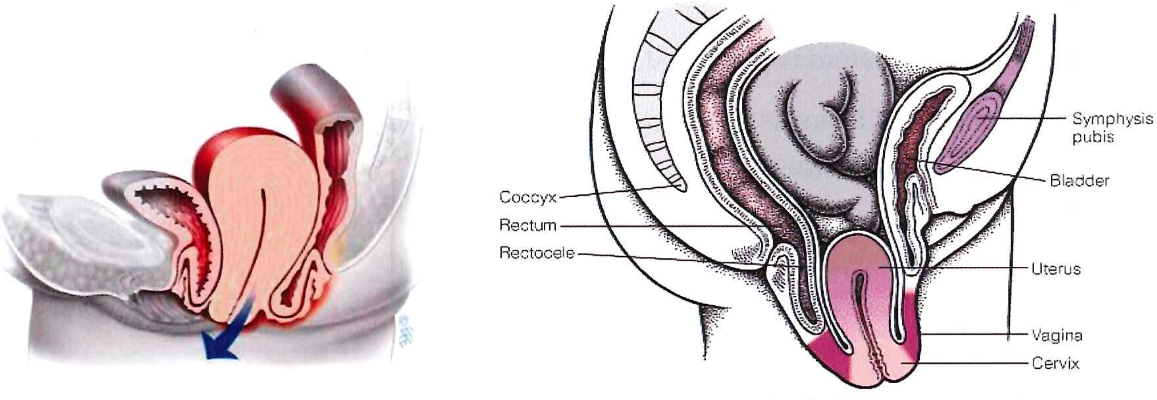
It starts as uterine prolapse (due to weak cervical ligaments) and is followed by vaginal descent. This is more common in virginal or nulliparous prolapse.

b. *Vagino-uterine* :

It starts as vaginal prolapse (mainly due to obstetric trauma) with injured levators and is followed by descent of the uterus.

Degrees of uterine prolapse:

- ***1st Degree***: The cervix descends below its normal level on straining but does not protrude from the vulva (normally the ext. os is felt at the level of ischial spines).
- ***2nd degree***: The cervix protrudes from the vulva on straining.
- ***3rd degree (complete procidentia)***: The whole uterus is completely prolapsed outside the vulva and the vagina is inverted over it.



Procidentia of the uterus and vagina.

Degrees of uterine prolapse

Anatomical changes occurring in prolapse :

[I] Vagina:

- The walls becomes exposed, inverted, thickened due to edema-congestion-keratinization and may be pigmented.
- Trophic (decubital) ulcers of vagina and portio vaginalis may occur due to :

  - Chronic congestion (**).

  - Friction.

  - Atrophic changes due to menopause.

[II] Cervix:

- Hypertrophy of cervix due to chronic congestion and chronic infection.
- Elongation of supra-vaginal part of cervix (in vagino-uterine prolapse only). This is due to : The stronger upper parts of Mackenrodt's lig. are attached to supravaginal cervix while the weaker lower parts are attached to upper vagina.

[III] Bladder-urethra-ureters:

- Descent of the base of the bladder forms a pouch in which residual urine accumulates. This leads to inability to evacuate the bladder & irritation of bladder wall.
- Stretch of the int. urethral sphincter & its descent below the level of levator ani cause stress incontinence.
- Angulation & kink of urethra may occur in marked urethrocele. This might cause attacks of urine retention or it hides stress incontinence (prolapse must be corrected 1st by P.V. to demonstrate incontinence).
- Angulation & kink of ureters may occur in severe cases with back pressure on ureters & kidney (hydroureter & hydronephrosis).

Clinical Picture of prolapse :

A) Symptoms:

1. Before actual prolapse the patient feels sensation of heaviness & weakness in the perineum particularly at the end of the day.
2. Later on, the patient notices a mass which protrudes from the vulva on straining & disappears when she lies down.
3. In Cystocele or cysto-urethrocele, urinary symptoms are dominant in the form of :
    - Inability to complete micturition unless the mass is reposited by the patient.
    - Frequency by day due to irritation of trigone by residual urine. Later on, frequency & burning micturition occur day and night due to resultant cystitis.
    - Stress incontinence or rarely repeated attacks of urine retention.
    - Rarely symptoms suggestive of pyelonephritis as fever & loin pain due to ascending infection.
4. In rectocele, inability to complete defecation unless the mass is reposited by the patient and constant desire to defecate with rectal heaviness may be present.
5. Backache due to stretch of the uterosacral ligaments.
6. Leucorrhea, congestive dysmenorrhea and menorrhagia may occur, due to pelvic congestion.
7. Sexual symptoms may be present due to redundant vaginal walls.
8. There may be symptoms of precipitating factors as chronic cough or may be history of previous attempt of repair (the 1st chance is usually the best chance of adequate repair).

B) Signs:

▣ ***General and abdominal examination***:

a. Any precipitating factor (increased intra-abdominal pressure), as bronchitis, abdominal tumor or ascites.

b. Tone of abdominal muscles (may be associated hernia), or visceroptosis (descent of abdominal organs below their normal position). This may associate some cases of congenital prolapse due to generalized weak muscular and fascial support all over the body.

c. Ex. of the back is very important in cases with virginal or nulliparous prolapse to detect evidence of spina bifida occulta

▣ ***Local examination***:

- Tone of levator ani is tested by 2 fingers in vagina & thumb on the perineum to feel the muscle contraction while the patient is asked to cough.
- 1st degree uterine prolapse is only diagnosed by P.V. where ext. os is found to be lower than ischial spines. In 2nd and 3rd degree uterine prolapse, there is a mass protruding outside the vulva. To differentiate 2nd from 3rd degree, try to approximate your fingers at the vulva. If fingers could be approximated, it is 3rd degree prolapse (the whole uterus is prolapsed below the level of the examining fingers). If fingers cannot be approximated, it is 2nd degree prolapse (only part of the uterus is prolapsed and it is felt between examining fingers).
- In enterocele, there is descent in upper part of the post. vaginal wall. There is impulse on cough and gurgling of intestine.
- To demonstrate stress incontinence. Ask the patient to cough in standing position and abducting her thighs. The bladder must be full or nearly so. If no stress incontinence could be detected, the test could be repeated after reposition of the prolapsed mass to detect hidden stress incontinence.
- To demonstrate supra-vaginal elongation of cervix :

  Detect the length of cervical canal by a uterine sound which is introduced through the ext. os till it reaches the resistance of int. os. The length of portio-vaginalis is detected by a sound introduced in the lat. fornix. Length of supravaginal cervix=length of cervical canal – length of portio-vaginalis.

Differential diagnosis:

- ***Cystocele*** :
  - Cyst of the ant. vaginal wall (e.g. Gartner's cyst) : It is incompressible and passage of a catheter will show a normal direction of the urethra.
  - Urethral diverticulum : Pressure on the diverticulum will lead to discharge of urine or pus from ext. meatus.
- ***Rectocele***:
  - Cyst of the post. vaginal wall (e.g., implantation dermoid cyst) : It is incompressible.
  - Enterocele (hernia of Douglas pouch): See before.
- ***Uterine prolapse*** :
  - Congenital elongation of the portio-vaginalis: The elongation is apparent in the vaginal with deep fornices. The vaginal vault is felt at its normal level (approximately at level of ischial spines).
  - Other swellings protruding from the vulva as large fibroid polyp, inverted body of the uterus: Absence of ext. os.

Special investigations :

(The aim is to prepare the patient for operation).

- Complete blood picture to detect anemia.
- Complete urine analysis to detect urinary tract infection.
- Urea and creatinine (to detect renal impairment 2ry to pyelonephritis). I.V.P. may be done to detect back pressure on kidneys and ureters.
- Fasting and 2 hours post-prandial blood sugar.
- ECG if the patient is above 40years.
- Others according to the case, e.g., liver functions (if there is history of liver disorders).
- X-ray of lumbo sacral area should be done in cases with virginal or nulliparous prolapse to check for spina bifida.

Treatment of prolapse:

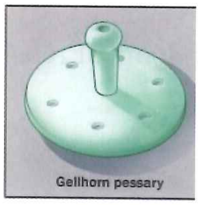
▣ *Prevention*:

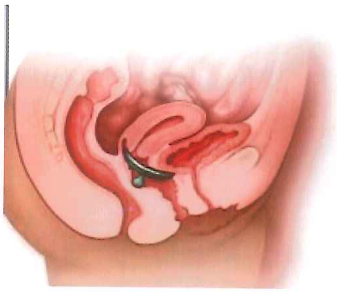
- Avoid obstetric trauma (see etiology).
- Postnatal exercise and correction of retroversion. The patient should lie on the ventral position few hours a day and try to squeeze her levators and hold herself repeatedly especially during micturition.
- Proper spacing of deliveries.

▣ *Pessary treatment*:

It does not treat prolapse but only holds it up so long as the pessary is used. Used in very old age, debilitating, surgically unfit women, or temporary till treating the precipitating factors.

The pessary should be removed regularly, cleaned and vagina is examined (for evidence of mechanical vaginitis).





✱ *Surgical ttt:*

It is the ttt of choice in the majority of cases. It depends on type of prolapse, age and parity of the patient.

- **Time of operation:**

➢ 3 to 6 months after delivery (till complete involution occurs).

➢ Postmenstrual as there is less vascularity and to decrease incidence of infection by menstrual blood.

- **Pre-operative preparations:**

➢ Correction of anemia (if present) and urinary tract infection.

➢ ttt of trophic ulcers by reposition on the prolapse by daily vag. pack to decrease congestion. Estrogen creams could be used to induce healing of ulcers and growth of epithelium in post-menopausal female.

Types of operations:

[I] In the childbearing period:

***Vaginal prolapse*:**

1. *Cystocele*: ttt by ant. colporrhaphy or better classical repair which consists of ant colporrhaphy and post. colpo-perineorrhaphy :

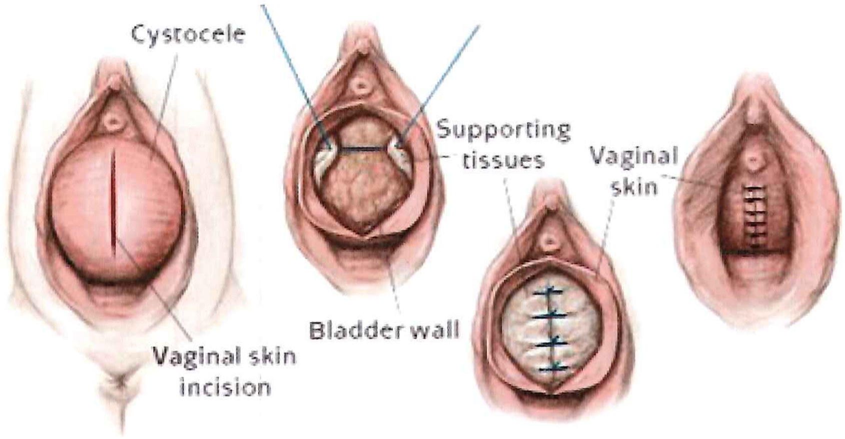
▣ **Ant. colporrhaphy:** It is the actual ttt of cystocele.

If there is associated stress incontinence special plication of the fascia at the bladder neck by **Kelly's sutures** is done.

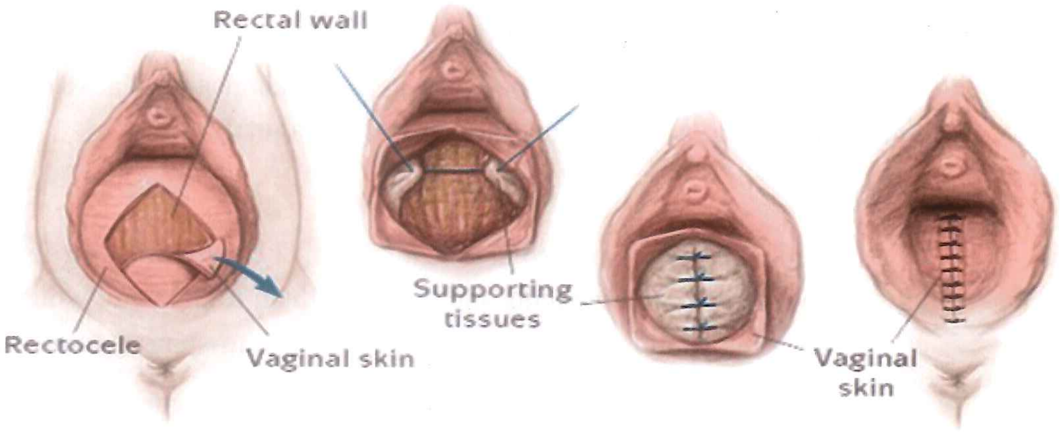
▣ **Post colpo-perineorrhaphy**: for support of cystocele repair.

2. *Rectocele*: It is ttt by post. colpo perineorrhaphy.
3. *Cysto rectocele*: ttt by classical repair.
4. *Enterocele*: The same as rectocele with upward dissection till the hernial sac (peritoneum of Douglas pouch) is reached. The sac is opened, intestine is reposited, the sac is excised as high as possible. Both uterosacral ligaments are sutured together in midline to prevent recurrence.

In cases with very large enterocele abdominal repair is done with obliteration of Douglas pouch by many sutures.



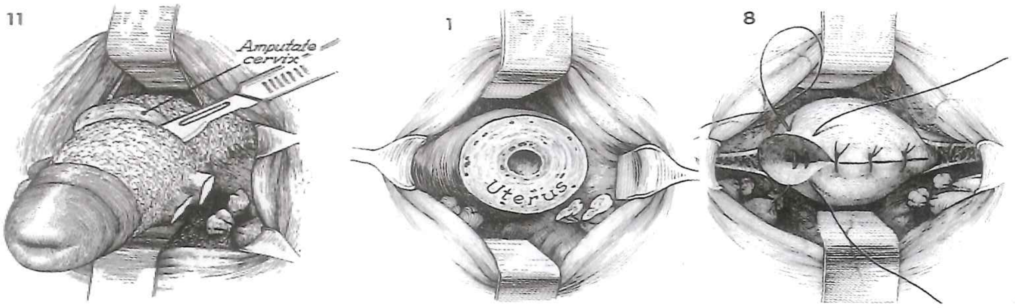
Anterior colporrhaphy for cystocele



Posterior colpoperineorrhaphy

Uterine prolapse

Without elongation of cervix	With elongation of cervix
Classical repair with suturing Mackenrodt's lig. together in midline to antevert the uterus.	Fothergill's or Manchester operation which consists of classic repair and amputation of long cervix and shortening of the Mackenrodt's.



Manchester operation

[II] Old age:

1. Vaginal prolapse (cystocele and rectocele): as in childbearing period.
2. Uterine prolapse: vaginal hysterectomy is done with suturing all the pedicles (uterosacral lig. and Mackenrodt's lig.) to the vaginal vault to prevent vault prolapse. Also classical repair is done to manage associated vaginal prolapse.
    - Rarely, in very old age with poor general condition, Le Fort operation is done in which rectangular flaps are excised from both ant. and post. vaginal walls and the raw areas are sutured together obliterating the vagina partially. The unclosed lat. parts allow escape of any cervical discharge (modified Le Fort operation).

[III] Vault prolapse:

It is the descent of the vaginal vault after hysterectomy.

- *Prevention:* By suturing all the pedicles as uterosacral and Mackenrodt's lig. to the vaginal vault during hysterectomy (abdominal or vaginal).
- *Actual ttt:*
  - Vaginal repair similar to classical repair. The vault must be opened to identify the remnants of ligaments and to suture them to the vault which is then closed or fix the vault to sacro-spinous ligament (sacro-spinous fixation).
  - Abdominal repair: if very large with very weak ligaments, the vault could be fixed to the promontory of sacrum (sacrocolpopexy). It is also useful in virginal prolapse.

Post-operative care after prolapse operations:

- Vaginal pack for 24 hours (to prevent bleeding in loose para vaginal tissues).
- Urinary catheter for 2-5 days.
- Antibiotics.
- Excess fluids.
- Repeated washing of the vulva and perineum with antiseptic solution.

Complications of prolapse operations:

1. Anesthesia complications as hypoxia, aspiration of gastric contents and may be cardiac arrest.
2. Hemorrhage and shock.
3. Injury to an important structure as bladder, ureters or rectum.
4. Post-operative infections.
5. Deep venous thrombosis and may be pulmonary embolism.
6. Late post-operative complications as dysparunia (in classical repair), infertility or recurrent abortion (in Fothergill's operation), vault prolapse (after vaginal hysterectomy) or recurrence of prolapse.

Causes of recurrent prolapse:

a) Pre-operative causes:

- Congenitally weak support.
- Patient is not well prepared to the operation with persistent infections, trophic ulcers or chronic bronchitis.

b) Operative causes:

- Undiagnosed enterocele or supravaginal elongation of cervix.
- Ill-chosen operation.
- Poor surgical technique.

c) Post-operative causes:

- Post-operative hematoma and infections.
- Early heavy lifting.
- Repeated pregnancies following the operation or post-menopausal atrophic changes.

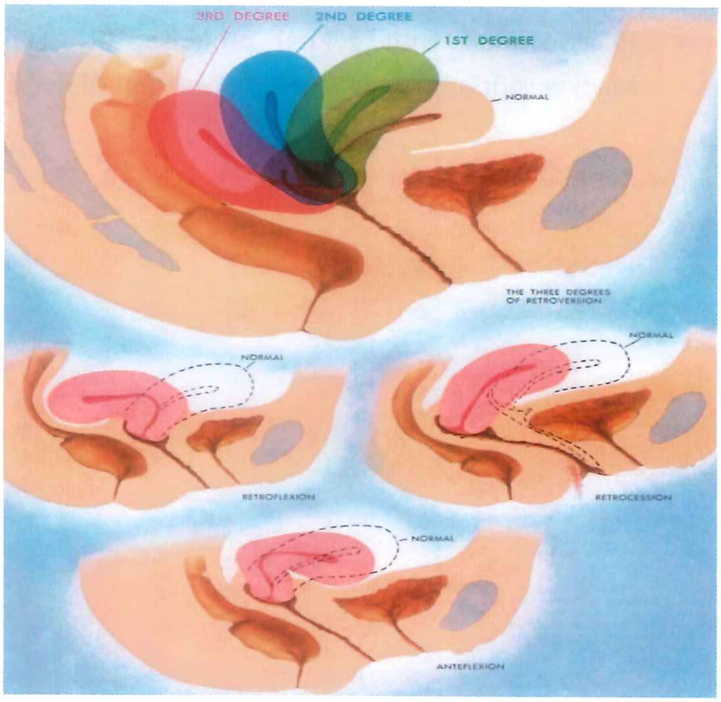
Retro-Version-Flexion

Varieties:

1. ***Congenital (mobile RVF)***: 15% of women, it produces no symptoms and requires no treatment.
2. ***Acquired (fixed RVF)***: *Pelvic pathological lesions* as pelvic adhesions (e.g. in endometriosis) or in post. wall myoma (fixed retroversion).

Degrees:

- *1st degree:* fundus is directed towards the promontory of sacrum.
- *2nd degee:* fundus is directed towards the sacral concavity.
- *3rd degree:* the fundus is directed towards the tip of the sacrum.


3RD DEGREE
2ND DEGREE
1ST DEGREE
NORMAL
THE THREE DEGREES OF RETROVERSION
NORMAL
RETROFLEXION
NORMAL
RETROCESSION
NORMAL
ANTEFLEXION

RVF uterus

Symptoms:

- Mostly asymptomatic.
- Dysparunia if the ovaries are prolapsed in Douglas pouch.

Signs:

- The ext. os is directed downwards and forwards or directly forwards (normally it is directed downwards and backwards).
- Uterine sound can diagnose the direction of the uterine cavity.

Treatment:

- *Prevention*: After delivery advice females to lie on the ventral aspect for few hours daily.
- *Actual ttt*:
  - No symptoms → no treatment.
  - Symptomatic cases : We have to determine whether retroversion is responsible for these symptoms or not by pessary test : correct retroversion manually and keep it in place by pessary (Hodge Smith pessary). If symptoms ae still present, retroversion is not the cause.

  a. Pessary could be used as a temporary ttt in puerpural type or in early pregnancy.

  b. Surgical ttt : Rarely done nowadays :
    - If associated with genital prolapse, ttt of prolapse with suturing the Mackenrodt's ligaments together infront of cervix to antevert the uterus.

Urinary Incontinence

Involuntary loss of urine that is objectively demonstrable and results in social & hygienic problem.

Classification:

(A) Extra urethral incontinence :

- Genito-urinary fistula (see later)

(B) Urethral incontinence :

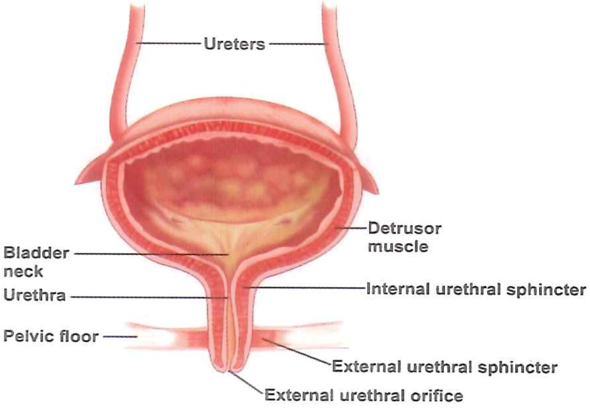
Increases with age & parity :

- Genuine stress incontinence (urodynamic incontinence)
- Urge incontinence (detrusor instability)
- Mixed type.
- Retention with over flow.
- Nocturnal enuresis.

Genuine stress incontinence

(Urodynamic stress or sphincter incontinence)

Involuntary leak of urine drops from urethra on sudden rise of intra-abdominal pressure as sneezing, coughing or laughing.


Ureters
Detrusor muscle
Bladder neck
Urethra
Internal urethral sphincter
Pelvic floor
External urethral sphincter
External urethral orifice

Anatomy of the urinary bladder

Etiology: Weakness or descent of internal urethral sphincter.

- ***Weak*** sphincter may be:
  - Congenital: Rare, familial factor may be present.
  - Traumatic: mainly obstetric trauma due to repeated childbirth (commonest)
  - Postmenopausal atrophy.
  - Sometimes, this occurs during pregnancy due to relaxing effect of progesterone hormone. It improves after labor

- ***Descent*** of the sphincter below urogenital diaphragm as in some cases of cystocele due to loss of the muscular shutter mechanism on increased intra-abdominal pressure.

Precipitating factors:

Obesity, chronic cough, constipation, ascites, pelvic masses (chronic increased intra-abdominal pressure).

Diagnosis:

- ***Symptoms*** :
  - Escape of urine drops on cough or sneeze.
  - Urgency, frequency may be present in mixed cases.
  - Mass protruding from vulva on straining in cases due to genital prolapse.
- ***Signs*** :
  - Demonstrate stress incontinence by asking the patient to cough while in dorsal position.
  - Presence and degree of genital prolapse if any.
  - Bonney's test: to differentiate weak sphincter from descent of sphincter. Elevate bladder neck upwards by 2 fingers in ant. Vaginal wall on each side of urethra without compression and ask the patient to cough.

    If escape of urine is prevented → descent of bladder neck is diagnosed. If still urine escapes → weak sphincter is diagnosed.

Urge incontinence

(Detrusor instability-overactive bladder)

The 2nd most common cause of female incontinence (after genuine stress incontinence).

Etiology:

- Local bladder irritation e.g. cystitis, ulcer polyp, after surgical treatment of prolapse or genuine stress incontinence.
- Idiopathic or psycho logic.

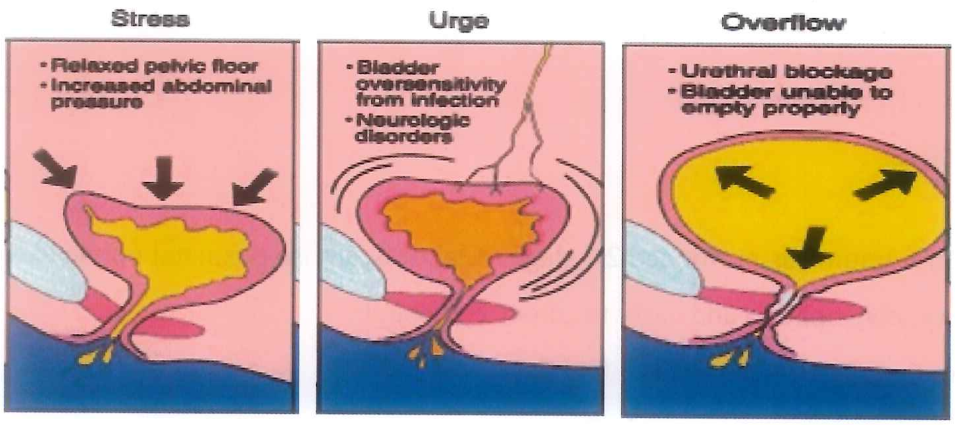
Diagnosis:

The urge to pass urine cannot be inhibited & some urine will leak involuntarily while the patient is on way to W.C. Mixed stress & urge incontinence may be present.

Retention with over flow

(Over flow incontinence)

Rare condition which may occur in some spinal cord lesions & is associated with obvious neurologic affection or associating acute urine retention with severe bladder pain and desire of maturation.


Stress
•Relaxed pelvic floor
•Increased abdominal pressure
Urge
•Bladder oversensitivity from infection
•Neurologic disorders
Overflow
•Urethral blockage
•Bladder unable to empty properly

Types of urinary incontinence

Nocturnal Enuresis

Occurs mainly in children. Psychological factors may influence.

Investigations for a case of urinary incontinence

History & examination:

- ***Genito-urinary fistula***: continuous (day & night) urine drippling (see fistula).
- ***Genuine stress incontinence***: only drops of urine – not associating desire of micturition-usually on sudden cough or sneeze.
- ***Urge incontinence***: more than drops of urine-associated with desire of micturition.
- ***Retention with overflow***: obvious neurologic affection or agonizing bladder pain with acute retention.
- ***Nocturnal enuresis***: only by night, may be psychological disorders.

Specific Investigations:

- Cases suspected to be genitor-urinary fistula: Methylene blue test & …. (See fistula).
- Midstream urine to detect infection with pus cells. Culture and sensitivity may be needed.
- Urodynamic studies :

  Aim mainly to differentiate genuine stress incontinence from urge incontinence & diagnose mixed cases. There are many tests to determine bladder function & pressure changes in bladder and urethra. Genuine stress incontinence is characterized by decreased urethral closure pressure while urge incontinence is characterized by uninhibited bladder activity with minimal filling.

N.B.: Parameters of normal bladder function:

- 1st desire to void urine between 150-200ml.
- Capacity (strong desire) between 400-600cc.
- Residual urine < 50ml.
- Detrusor pressure during filling < 15cm H_2O.
- No leak on cough

Management of urinary incontinence

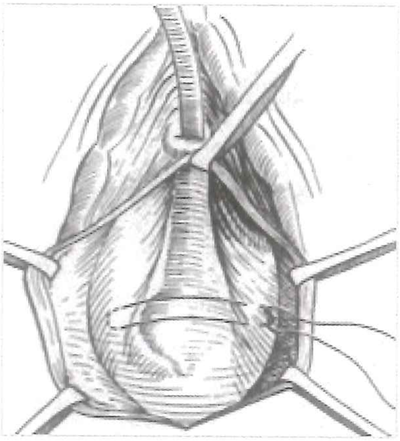
- Genito-urinary fistula: …. (See fistula repair)

- Genuine stress incontinence:

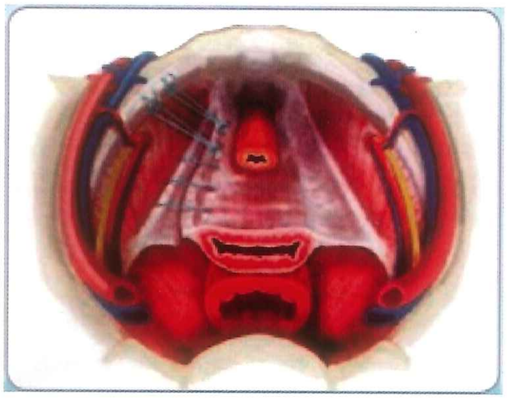
- ***Preventive***:
  - Avoid obstetric trauma as prolonged 2nd stage of labor & advise postnatal pelvic exercises
  - Avoid obesity, constipation and early ttt of chronic cough.
  - Replacement therapy for menopausal females.
- ***General measures and exercise***:
  - Restrict fluids.
  - Repeated pelvic floor exercises (Kegel's excercises).
- ***Medical measures***:
  - Estrogen creams in menopausal females to restore epithelial integrity of sphincter.
- ***Surgical measures*** :
  - In cases of cystocele, **Kelly's sutures** are done during ant. Colporrhaphy. With high failure rate.
  - **Burch colpo-suspension**: Suture the tissues on both sides of bladder neck to pectineal part of inguinal ligament (high success rate). Abdominal approach, done in recurrent cases or in association with other abdominal surgery.
  - **Sling operations**: In the past natural sling from rectus sheath was used. Synthetic materials are now used to make a sling around bladder neck without tension (tension free vaginal tape **T.V.T**). It is considered now the treatment of choice.
  - **TOT (trans-obturator tape)** may be used with less incidence for urinary bladder injury.
  - Periurethral injection of collagen to induce fibrosis & constrict the bladder neck.

- Urge incontinence:

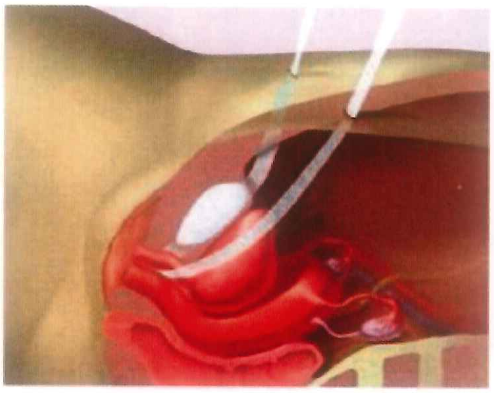
- ***General measures:*** restrict excess fluids and bladder training to increase intervals between voids.
- ***Medical treatment*** :
  - Treatment of any bladder infection.
  - **Anticholinergic drugs:** to reduce the vesical pressure and increase the bladdervolume (e.g.; detrusitol 2mg twice daily) in urge incontinence.



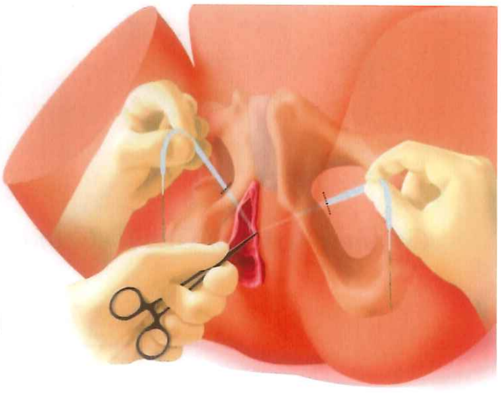
Kelly’s sutures



Burch colpo-suspension



TVT

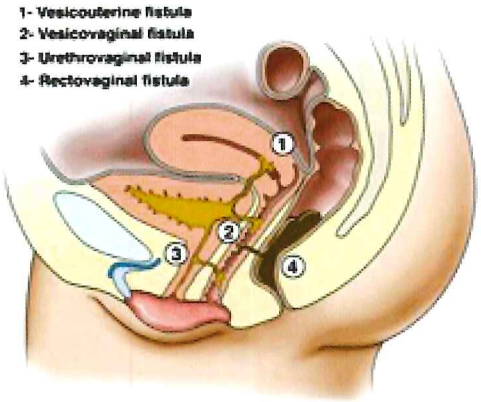


TOT

Genito-Urinary Fistula

Types:

Vesico:	- Vaginal.	- Cervical.	- Uterine
Uretro:	- Vaginal.	- Cervical.	- Uterine
Urethro:	- Vaginal.		



Common types of Genito-Urinary fistulas

1- Vesico-Vaginal Fistula

Etiology:

- **Congenital**: Very rare.
- **Traumatic**: The commonest cause, mostly surgical nowadays.

Surgical trauma:

- Abd. Operations, e.g., caesarian section, myomectomy, hysterectomy.
- Vaginal operations, e.g., hysterectomy, ant. Colporrhaphy and fothergill's operation.

Obstetric Trauma:

It was very common in the past. It occurs in 2 types:

- Necrotic obstetric trauma:
  - Occurs in obstructed labor.
  - There is prolonged compression of the bladder and vagina between the fetal head and symphysis pubis so, ischemia, necrosis with subsequent sloughing of the necrotic area occurs.
  - Fistula develops 5-7 days after labor.
  - It has a bad prognosis as it is large in size with decreased blood supply
- Direct obstetric trauma:
  - Occurs as a result of direct injury of the vagina and bladder during labor, e.g., during forceps application, or some cases of rupture uterus.
  - Fistula develops immediately after labor.

- **Inflammatory:**
  - Non-specific infections: Pelvic abscess that opens in the bladder and vagina.
  - Specific infections: T.B. or bilharziasis.
- **Neoplastic**:

  e.g., advanced cases of cancer cervix, bladder or vagina.
- **Others:**

  e.g., radium necrosis as a complication of radiotherapy for ttt of pelvic malignancy.
  - This causes endarteritis obliterans with subsequent sloughing and necrosis.
  - It develops months after irradiation.
  - It has the worst prognosis.

Clinical Picture:

Symptoms:

- **True Total Incontinence:**

  Day and night
  Dribbling of urine.

  No desire for
  micturition (no
  bladder filling)

  Except → *Small.*
  → *High*

  The incontinence will be partial, i.e., the patient can retain some urine in the bladder.
- Descending infection due to irritation by urine as vaginitis, vulvitis and infection of the medial aspects of the thighs (burning pain and pruritus).
- Ascending infection with cystitis, pyelitis and nephritis (pain in spurapubic region or pain in the loin radiating to the groin).
- Amenorrhea may occur in some cases due to :
  - Hypothalamic suppression with absent GnRH secretion due to the psychological disturbance caused by the fistula.
  - Lactational amenorrhea.
  - Pituitary necrosis, i.e., Sheehan syndrome as a result of severe post-partum hemorrhage which usually associate the obstetric trauma.
- Adequate history taking is important to predict the prognosis, e.g., :
  - Previous attempt of repair, as usually the 1st chance is the best chance for successful repair.

Signs:

- **General ex. :**
  - Pallor suggestive of anemia.
  - Manifestations of uremia due to ascending nephritis are very rare (toxic, earthy looking patient).
- **Abd. ex. :**
  - Tender loin or hydronephrosis.
  - Scar of a previous operation may be present.
- **Vaginal ex. :**

a. Inspection of ext. genitalia :

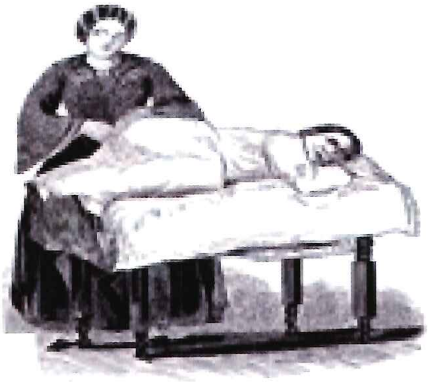
- Urine drippling from the vulva with its characteristic odor is detected.
- Evidence of vulvitis and infection of the medial aspects of the thighs (red skin with whitish phosphate depositions) are detected.

b. Inspection of the fistula itself in the ant. vaginal wall :

- The patient is put is Sims' position using Sim's speculum.
- We have to comment upon the following items :
  - ***Site*** of the fistula (high or low).
  - ***Size*** of the fistula (small or large).
  - ***Number*** of the fistulae (single or multiple).

N.B.: Sim's Position:

- Patient lies on her Lt Side near the edge of the table.
- Lt. Thigh and knee are semi extended; Rt. Thigh and knee are fully flexed.
- Lt. Arm behind the patient, Rt. Arm grasps the edge of the table.
- Pelvis is raised to allow air to rush into the vagina to distend it after introduction of the speculum (the intestines are displaced up away from the pelvic floor creating a –ve pressure in the pelvis).



Sim's position

Sim's speculum

C. Palpation of the fistula in the ant. Vaginal wall:

- By P.V to confirm site, size, and number of the fistulae. In addition, associated fibrosis surrounding the fistula and capacity of the vagina are detected.
- Passage of a metal sound or a catheter through the urethra to be felt in the vagina could be done to detect the site of small fistula.

Differential diagnosis: From other type of G.U. fistulae and other types of incontinence:

- **Uretrovaginal fistula**:
  - ***History***: Incontinence is usually partial.
  - ***Ex.***: Fistula is situated high in the vagina, usually in the lat. fornix.
  - ***Specific investigations:*** methylene blue test- cystoscope - indigo carmine test – I.V.P. (see later).

Special Investigations:

A) Investigations to document the diagnosis:

- **Methylene blue test :**
  - 3 pieces of gauze are placed in the vagina one above the other.
  - Inject 200 c.c. of sterile colored saline with methylene blue into the bladder through a urethral catheter.
  - Allow the patient to walk for few minutes as the fistula may be valvular.
  - Examine the upper and middle pieces of gauze. The lower one is discarded as it is usually stained during filling of the bladder :
    - If stained with blue color →vesico vaginal F.
    - If stained with uncolored urine → uretro-vaginal F.
    - If unstained → check your diagnosis (other types of incontinence).
- **Cystoscope :**

  It must be done in every case. The urinary bladder must be distended with saline to allow visualization of the inner walls. To allow this, vaginal pack is put to prevent escape of saline from the fistula opening, the urologist must comment upon the following items:

  - Site of the fistula: i.e., its relation to ureteric orifices.
  - Size: small or large.
  - Number: single or multiple.
  - Associated bladder pathology, e.g., cancer bladder.

B) Investigations to detect complications:

Intravenous pyelography: for assessment of the renal functions, diagnosis of hydroureter, hydronephrosis or site and side of associated ureteric injury if present.

C) *Investigations to prepare the patient for operation (to check surgical fitness)*:

- Complete blood picture: anemia could be detected.
- Complete urine analysis (usually collected by a catheter): urinary tract infection could be detected.
- Urea and creatinine: to check kidney functions.
- Liver enzymes as SGOT, SGPT: to check liver functions.
- Blood sugar (fasting and 2 hours post prandial): diabetes, if present, should be controlled before surgery.
- E.C.G.: if the patient is above 40 years.

Treatment:

A) *Prevention:*

- Avoid surgical trauma by proper dissection of the bladder during surgery.
- Avoid obstetric trauma e.g. :
  - Early detection and management of obstructed labor.
  - Avoid direct injuries, e.g., by forceps (the bladder must be empty).
- Early ttt of infections (e.g. pelvic abscess) and malignancy (e.g. cancer cervix).
- 2ry prevention by :
  - Detection of any bladder injury during surgery and its immediate repair. A catheter is fixed for 15 days postoperative. Healing will occur in most of cases.
  - If fistula is discovered after a difficult labor, a catheter should be fixed for 15 days to divert the urine away from the fistula and antibiotics are given. The fistula may heal completely or, at least, becomes smaller in size.

B) *Actual ttt:*

- **Rule**: 3 – 6 months should pass following the causative injury or following a previous attempt of repair to allow maximum healing of tissues.
- **Preoperative preparations:** Keep the skin of the vulva and inner aspects of the thighs covered by zinc oxide cream to prevent maceration and infection of the skin by urine. Also, it has an antiseptic property in addition.
- **Operations:** Usually vaginal repair (flap splitting), occasionally abdominal repair is done in some selected cases,
- **Postoperative care:**
- Vaginal pack for 24 hours.
- Catheter is left for 15 days.
- Large amounts of fluids, at least 3 liters per day to wash debris and blood clots, especially if the urine is bloody.
- Antibiotics.
- No sexual intercourse for 3 months – no pregnancy for 1 year.

- Subsequent deliveries are by C.S. (usually classic upper segment C.S. to avoid any bladder trauma).

- **Causes of failure of operation (recurrent fistula):**

Preoperative causes:

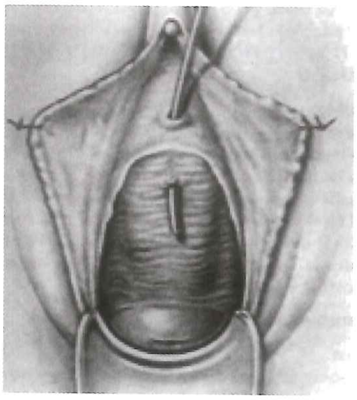
- Friable tissues, e.g., the repair are done shortly after the trauma.
- Infections of genital or urinary system.

Operative causes:

- Ill-chosen operation.
- Improper surgical technique.

Postoperative causes:

- Obstruction of the catheter (the commonest).
- Hematoma and post-operative infections.



Small vesico-vaginal fistula

2- Uretro-Vaginal Fistula

Etiology:

- **Congenital**: Very rare.
- **Traumatic**:

The commonest is surgical trauma, e. g:

- Abd. Operations as myomectomy-hysterectomy or rarely during C.S.
- Vaginal operations, e.g., hysterectomy, ant. Colporrhaphy or Fothergill's operation.
- During hysterectomy, the ureter is liable to be injured in the following steps :
  - On clamping the infundibulo-pelvic ligament.
  - On clamping the uterine artery as it crosses the ureter 1.5cm lateral to the cervix.
  - On clamping the parametrium.
  - On clamping the angles of the vagina.

There are many conditions in which there is greater liability for ureteric injury e.g.:

- Distortion of the anatomy of the ureter by large ovarian tumor, tuba-ovarian abscess, broad lig fibroid or cervical fibroid.
- Marked adhesions in the pelvis due to endometriosis or repeated laparotomies.
- During radical hysterectomy either due to direct injury to the ureter or avascular necrosis due to excessive dissection with interruption of its blood supply.

Clinical Picture:

Symptoms:

- Partial incontinence: The patient has a desire for micturition as the bladder fills from the healthy ureter.
- Descending infections with vaginitis, vulvitis and infection of the medial aspects of the thighs.
- Ascending infections with pyelitis and nephritis.
- Amenorrhea may occur in some cases due to psychological disturbance, or hysterectomy.
- History taking will reveal the etiology.

Signs:

- General ex.: Look V.V.F.
- Abd. ex.: Look V.V.F.
- Vag. ex.: Look V.V.F.

Differential diagnosis:

From other types of G.U. fistulae and other types of incontinence (look V.V.F.).

Special Investigations:

Investigation to document the diagnosis:

- Methylene blue test: (See before).
- Cystoscopy: (See before).
- Intravenous pyelography should be done to detect side and site of ureteric injury.

Investigations to prepare the patient for operation: (See before)

Treatment:

A) Prevention:

Pre-operative measures:

- Intravenous pyelography to detect the course of ureter in cases predisposed to ureteric injury (enumerate?).
- Introduction of ureteric catheters through cystoscope may be done immediately before operations in some cases.

Operative measures:

- Identify the ureter at the start of operation.
- Proper dissection of the bladder downwards to push the ureters laterally away from pelvic genital organs.
- Proper surgical technique.

3- Urethro-Vaginal Fistula

Aetiology: Usually obstetric trauma due to difficult instrumental vaginal delivery with injury of urethra and vagina.

Clinical Picture:

The patient is continent as the fistula lies below the level of internal urethral sphincter but during micturition there is double stream urine (urine passes from both urethra and vagina).

Treatment: Vaginal repair.

4- Vesico-Uterine Fistula

Etiology: Usually obstetric trauma due to C.S.

Clinical Picture:

- The patient is incontinent.
- Menouria may occur, i.e. menstrual blood passes through the bladder and urethra.

Treatment: Abdominal repair.

Recto Vaginal Fistula

Etiology:

- **Congenital**: Very rare.
- **Traumatic**: The commonest type :
  - *Obstetric Trauma*: e.g., undiagnosed complete perineal tear occurring during labor (commonest).
  - *Surgical trauma*: e.g., during post colpo-perineorrhaphy or hysterectomy.
  - *Accidental trauma:* Very rare.
- **Inflammatory**:
  - Non-specific: ….
  - Specific: ……… (Look V.V.F.)
- **Neoplastic**: e.g., advanced malignancy of rectum, vagina or cervix.
- **Others**: e.g., radium necrosis …… (Look V.V.F.)

Clinical Picture:

Symptoms:

- Large fistula: stool and flatus incontinence, 2ry vaginitis and leucorrhea occur.
- Small fistula: only flatus incontinence and leucorrhea.

Signs:

- Inspection and palpation of the post. Vaginal wall, rectal ex. and simultaneous recto-vag. ex. will reveal the fistula.
- A small probe can be passed from the vagina to be felt in rectum.

Treatment: **Surgical Repair**

Pre-operative measures (for 5 days):

- Non-residue diet (clear fluids-avoid dairy products).
- Intestinal antiseptic as neomycin 1gm orally twice daily.
- Daily cleaning enema and vaginal douche.

Operations:

- Fistula in lower 1/3 → convert it into complete perineal tear, and repair.
- Fistula in middle 1/3 → dedoublement operation with proper mobilization of rectum and vagina and closure of each of them separately.
- If the fistula is very high, recurrent and in congenital fistulae → abdominal repair. Temporary colostomy could be done 1st.

Post-operative measures:

- Continue non-residue diet for another 5 days.
- Antibiotics and intestinal antiseptics.
- Wash the vulva and perineum with antiseptic solution repeatedly (especially after micturition).
- Paraffin oil, about 30cc is given orally on 5th day night and lubricant enema on 6th day morning to lubricate the stools.
- Subsequent deliveries are by C.S.

Abnormal Uterine Bleeding

Normal menstrual cycle is characterized by being regular, rhythmic, occurring at an average of every 28 days ± 7 days and lasting for an average of 5 days (3-7). The amount of blood loss varies from 30-80cc/cycle. Age of menarche is commonly between 11-14 years (mean 12.5), while menopause occurs around 52 years.

Definitions:

Menorrhagia : Prolongation of the menstrual flow, often associated with an increase in amount (>80ml/ cycle).

- ***Metrorrhagia***: irregular or acyclic bleeding, not related to menstruation.
- ***Contact bleeding***: Bleeding following intercourse, vaginal douch or P.V examination.
-

CAUSES OF AUB (FIGO 2011)

A.STRUCTURAL CAUSES: referred to as **PALM**

1. Pregnancy complications: as abortion, ectopic pregnancy, and hydatidiform mole
2. Polyps: endometrial and endocervical polyps
3. Adenomyosis: myometrial myohypertrophy due to intramyometrial endometriosis
4. Leiomyomas: benign myometrial tumours
5. Malignancies: endometrial and cervical carcinomas, and functioning ovarian tumours

B. NON STRUCTURAL CAUSES: referred to as **COEIN**

1. Coagulation disorders: as ITTP and Von-Willebrand disease
2. Ovulatory dysfunction: as chronic anovulation in PCOS
3. Endometrial hyperplasia: see later
4. Iatrogenic causes; as anticoagulant therapy, IUD induced bleeding and OCP break through bleeding
5. Non-classified aetiology: as systemic hypertension, capillary fragility, severe thyroid disorders, chronic liver disease and renal failure.

According to age group :

1. Childhood:

- Constitutional precocious puberty (puberty before age of 8 years).

- Foreign body introduction.

- Inflammatory lesions as severe vulvovaginitis in children.

-Tumours : Granulosa-theca cell tumor of the ovary (look ov. Tumors) or sarcoma of the cervix (grape like sarcoma – sarcoma Botryoid – very rare).

2. **At puberty**:

Dysfunctional uterine bleeding is the comonest as the cycles during the 1st year are usually anovulatory with frequent abnormalities as menorrhagia or polymenorrhea.

3. **Childbearing period**:

I.Menorhagia

A) General causes :

- Hypertension.
- Congestive heart failure.
- Blood coagulation defects e.g purpura, liver cirrhosis, use of anticoagulatns.

B) Local causes : (most common-associated with pelvic congestion)

- Fibroids (submucus and large interstitial).
- Diffuse adenomyosis.
- Chronic pelvic infections as chronic salpingitis & cervicitis.
- I.U.D associated.

C) Dysfunctional menorrhagia : (See later)

II.Metrorrhagia

A. **Complications of undiagnosed pregnancy** e.g. abortion ectopic pregnancy or vesicular mole.

B. **Local causes (most comon) :**

- *Fibroids (submucus polyp with necrosed tip).*
- *Endometrial hyperplasia & endometrial polypi.*
- *Endometrial or cevical carcinoma.*

C. **Irregular use of hormones or O.C.P.**, sometimes it occurs with I.U.D.

D. **Dysfunctional metrorrhagia** (see later)

4. **Perimenopausal bleeding:** (About the age of 40 years or more).

The same as in childbearing period but :

- *Complications of pregnancy are rare.*
- *The commonest is D.U.B. But Every Case of Pre or Post Menopausal Bleeding Should be Considered Malignant Till Proved Otherwise.*

5. **Postmenopausal bleeding:** *(Bleeding from the genital tract one year after menopause).*

- Estrogen withdrawal bleeding : If it was used for relief of menopausal symptoms.

- General causes : (look menorrhagia).
- Local causes :
    - Premalignant lesions as C.I.N & endometrial hyperplasia.
    - Malignant neoplasm of genital tract as cancer cervix, endometrial carcinoma & functioning ovarian tumors.
    - Inflammatory lesions as senile vaginitis & endometritis.
    - Retained vaginal pessary or trophic ulcers of prolapse.
    - Atrophic endometritis or vaginitis: commonest cause
- Bleeding from other orifice as urethra (urethral caruncle) or rectum (piles or carcinoma).

Diagnosis:

- History and ex. could reveal the cause e.g.
    a. General diseases as ↑ BP or H.F.
    b. Local lesions of the genital tract.
- Specific investigations (Look investigations of a case of abnormal uterine bleeding)

Treatment:

- Treatment of the cause.
- General measures (only to improve general condition) e.g. iron and vitamin supplementation. Blood transfusion is given in severe cases. Anti-fibrinolytics as epsilon amino caproic acid.

Contact bleeding:

- **Etiology:**
    - *Cervical pathology*: e.g. cervical erosion, infected fibroid polyp or cervical cancer.
    - *Vaginal pathology:* e.g. menopausal atrophic changes, severe vaginitis, vaginal ulcers or carcinoma.
- **Diagnosis:**
    - Local ex. Usually reveal the cause e.g. cancer, polyp, ulcer.
    - Specific investigations: mainly to exclude cancer cervix e.g. pap smear, colposcopy or cervical biopsy (lock cancer cervix).
- **Treatment:** That of the cause

Dysfunctional Uterine Bleeding

Definition:

Abnormal bleeding from the genital tract in the absence of an organic cause but is due to functional disturbance of the normal mechanism of menstruation. This is usually diagnosed by exclusion of organic lesions.

Age incidence:

Any age between puberty & menopause but is more common before menopause & after puberty.

[I] Dysfunctional menorrhagia:

Dysfunctional menorrhagia may occur in the 1st few cycles after puberty and before menopause as these are usually anovulatory and menstruation is due to estrogen withdrawal bleeding only which is prolonged.

ttt:

- Mefenamic acid may be used to control the bleeding.
- Antifibrinolytics are also used.
- COCPs or gestagens may be used to control the bleeding, if the above medical treatment fail to control the condition.

[II] Dysfunctional metrorrhagia (Metropathia hemorrhagica)

- ***Cause***: Unknown.
- ***Uterus***:
  - Symmetrically slightly enlarged.
  - Endometrium is thick, may be polypoidal & shows cystic glandular hyperplasia with "Swiss Cheese" appearance. No secretory activity is present.

-***Clinically***:

Age: usually before menopause or after puberty

Symptoms: Short periods of amenorrhea (6-8 weeks) followed by excessive prolonged, painless bleeding.

Signs: Symmetrically slightly enlarged uterus –cystic ovaries could be felt.

Investigations:

- History and ex. will exclude general causes of bleeding e.g. hypertension, heart failure, and irregular use of hormones or others.
- Specific investigations :
  - U.S. (preferably vag. U.S.) : This diagnose slightly large uterus with thick endometrial lining. No local lesions as fibroid or carcinoma is present.
  - Fractional Curettage: Cystic glandular hyperplasia is present.

Treatment:

3 principles : - Control bleeding.
- Regulate cycles.
- In infertile cases, induction of ovulation should be done.

1) General measures: Only to improve general condition e.g. iron & vitamin supplementation.

2) Hormonal ttt:

- *Progestagens* : nor ethisterone 10-20mg daily orally for 21 days (3weeks every month). This will convert the hyperplastic endometrium into secretory and thus precipitate normal shedding (medical curettage). Treatment is continued for average of 6 months.
- *COCPs*: estrogen and progestagens should be continued for 3 weeks every month otherwise heavy estrogen withdrawal bleeding will occur.

- *Mirena IUD*: Progesterone released I.U.D is highly effective as it induces endometrial atrophy.
- Induction of ovulation is done in infertile cases.
- GnRH analogues: they produce a state of pseudomenopause. They are expensive and long-term use can cause osteoporosis.

3) Surgical measures:

- **Fractional curettage** :

  Indications: (diagnostic & therapeutic) :

  - In every case of perimenopausal bleeding to exclude endometrial hyperplasia or endometrial carcinoma and to diagnose type of dysfunctional bleeding.
  - In cases with severe bleeding to arrest the bleeding.

- **Hysterectomy** :
  - In perimenopausal cases if all measures failed to regulate the cycle.
  - In perimenopausal cases if endometrial hyperplasia is present. Usually panhysterectomy is done.

- **Endometrial ablation** :

  In cases unfit for hysterectomy. It is an induced Ashermann syndrome where the basal layer of the endometrium is destroyed either by a resectoscope or by laser under hysteroscopic vision or using hot intrauterine balloon. The patient becomes amenorrheic.

Investigations of a case of Abnormal Uterine Bleeding

History:

[1] Personal history:

*** Age:**

- Any case of perimenopausal & postmenopausal bleeding should be considered malignant till proved otherwise.
- D.U.B.: is common after puberty & near menopause.

*** Marital status:** Complications of pregnancy

*** Parity:**

- Cancer cervix is commoner in multipara, while cancer body & ovary are commoner in nullipara or low parity.
- Fibroid & endometriosis are common in nullipara or low parity.

[2] Present history:

★ Type of bleeding e.g.:-

- Menorrhagia -metrorrhagia - contract bleeding.
- Perimenopausal -post menopausal.
- This may give a clue for an etiology

★ Proceeded or not by:

- Period of amenorrhea (complications of pregnancy or metropathia hemorrhagic).
- Irregular use of hormones.
- I.U.D. insertion.

★ Associated or not by pain:

- Painless bleeding in metropathia hemorrhagica.
- Bleeding followed by pain in abortion.
- Pain followed by bleeding in ectopic pregnancy.

★ Duration of bleeding & its severity: Urgent interference or blood transfusion may be needed.

★ Symptoms suggestive of distant metastases if we suspect malignancy: Jaundice, hemoptysis, cough, swellings felt anywhere in the body, abdominal distension, pathological fractures & L.L. edema especially unilateral.

★ Symptoms suggestive of any other medical disorder: Bleeding tendency, heart troubles hypertension or others.

★ Investigations & ttt. Done to the patient

[3] Past history:

- Diseases: as ↑ BP, D.M., bleeding tendency.
- Operations: especially if related to bleeding e.g. curettage.
- Drugs: e.g. anticoagulants.

[4] Menstrual history:

Before the onset of the complaint. Also L.M.P or last attack of bleeding

[5] Obstetric history:

If the patient completed her family, hysterectomy could be considered especially in older patients.

[6] Family history:

There may be family history of cancer breast or ovarian cancer.

Examination:

General ex. : to detect general diseases. e.g. heart failure.

Local ex. : Vaginal ex., bimanual ex., & speculum ex. To detect local lesions in genital tract.

Specific investigations:

- ***Investigations to check fitness :***
  Complete blood picture – complete urine analysis – urea, creatinine, liver functions, fasting & 2 hours blood sugar –ECG.
- ***Document diagnosis*** : (i.e. detect the cause of bleeding)
  - US: Trans vaginal or trans-abdominal is an excellent tool to evaluate uterus (endometrial thickness, tumor, enlargement) & adenexae (neoplasm or functional cysts).
  - Vaginal & cervical smears to detect malignancy, (other tests to detect malignancy as colposcope could be done according to the condition).
  - Fractional curettage to detect malignancy in endocervix or uterine body (most precise).
  - Hysteroscopy to visualize the uterine cavity and to take guided biopsies.
  - Others according to the clinical data, e.g., bleeding & coagulation time.

Uterine Fibroid

Myoma-Leiomyoma-Fibromyoma

Definition:

It is a benign tumor of the smooth muscles of the uterus.

Incidence:

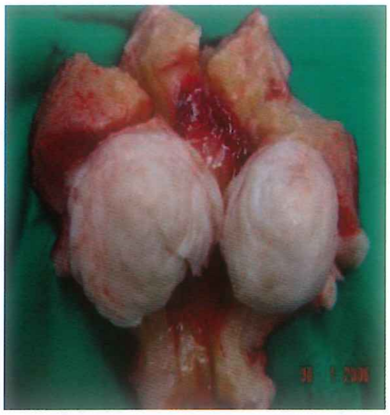
- It is the commonest uterine tumor, it is present in more than 20% of females > 30 years (many are asymptomatic). Clinical presentations usually occur in the premenopausal period
- **It is an estrogen dependent tumor**. This explains the following:
- It does not develop before puberty or after menopause.
- Existing tumors tend to atrophy after menopause.
- Common association with other estrogen dependant conditions as endometriosis and endometrial hyperplasia
- Many risk factors can contribute e.g. nulliparity, obesity, racial factors (more common in black Africans) & genetic factors with +ve family history in many cases.

Gross Pathology:

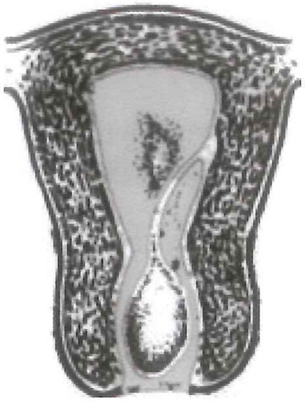
- Site :
    - Uterine body (commonest), usually multiple.
    - Cervical (4%), usually single.
    - Other rare sites: as broad lig.
- Shape :

Rounded, starts at interstitial. It may be become submucous or sub serous (both may become pedunculated).

- Consistency: Firm.
- Size: They start small but may attain any size.
- C.S.: Whorly appearance, paler than the surrounding due to decreased vascularity.
- Capsule: False capsule from compressed uterine muscles.
- Bl. Supply: From the capsule passing inwards or from the pedicle, this explains:
    - Calcification starts at periphery (increased vascularity).
    - Hyaline degeneration starts at center (decreased vascularity).
    - Necrosis of the tip of fibroid polyp (decreased vascularity).



Cut section in a hysterectomy specimen



Submuscous fibroid polyp

Microscopic Picture:

- Smooth muscles (short thick nucleus) and fibrous tissue.

Effects of fibroid on pelvic organs:

I. Uterus:

- Increased vascularity.
- Increased surface area of endometrium and endometrial hyperplasia or rarely endometrial carcinoma due to hyper estrogenic state.
- Myometrial hypertrophy.
- Rarely chronic inversion in fundal submucus fibroid.

II. Adnexa:

- Kink of tubes may occur in broad ligament fibroid.

III. Urinary system: It is affected in large cervical fibroid:

- Frequency due to pressure on bladder.
- Retention due to pressure on urethra.
- Hydroureter and hydronephrosis due to pressure on ureter.

2ry pathological changes in fibroid:

A) Degenerative changes:

Atrophy: Diminution in size after menopause and during puerperium (after marked enlargement during pregnancy).

Necrosis: e.g. tip of submucous fibroid polyp due to decreased blood supply.

Red degeneration or Necrobiosis :

- Incomplete necrosis from which the tumor is capable of recovery.
- It occurs due to thrombosis of vessels in fibroid capsule.
- It is more common during pregnancy due to:
  - Congestion.
  - Rapid growth of fibroid with kink of vessels.

  - Increased fibrinogen during pregnancy.
- *Pathogenesis*:

  Thrombosis leads to ischemia with lipoid toxins release. These toxins cause intravascular hemolysis with diffusion of blood pigments to the tumor (red tumor).
- *Clinically*:
  - Acute abdominal pain and vomiting.
  - The tumor becomes tender.
  - This should be differentiated from other obstetrical complications as acute pyelonephritis or accidental hemorrhage.
- *Treatment*:
  - Conservative ttt in the form of rest, and analgesics.
  - Myomectomy is contraindicated in pregnancy due to increased vascularity with risk of severe bleeding.

Hyaline degeneration:

- The commonest change, usually in center of large tumors.
- Whorly appearance is lost due to decreased vascularity and is replaced by homogenous, structure less eosinophilic material.
- Clinically: dull aching pain and the tumor becomes soft.

Cystic degeneration:

- Due to liquefaction of hyaline material, the tumor becomes soft or cystic so, could be mistaken with pregnant uterus.

Fatty deg.:

- Fat deposition with yellow color.

Calcification:

- Calcium deposition starts at the periphery due to increased blood supply.
- The tumor becomes white in color and hard in consistency.
-

B) Vascular changes:

Due to torsion of pedunculated subserous fibroid resulting in congestion, edema or rare rupture of surface vein with internal hemorrhage.

C) Malignant changes:

Less than 0.1% of cases may change to sarcoma. It is suspected when there is:

- Post-menopausal growth in absence of estrogen replacement therapy.
- Post-menopausal bleeding.
- Rapid growth.
- Rapid recurrence after removal.

D) Infection:

Occurs at the necrosed tip of fibroid polyp due to decreased blood supply. Infection is either blood born or from nearby organ. It is more common to occur in puerperium.

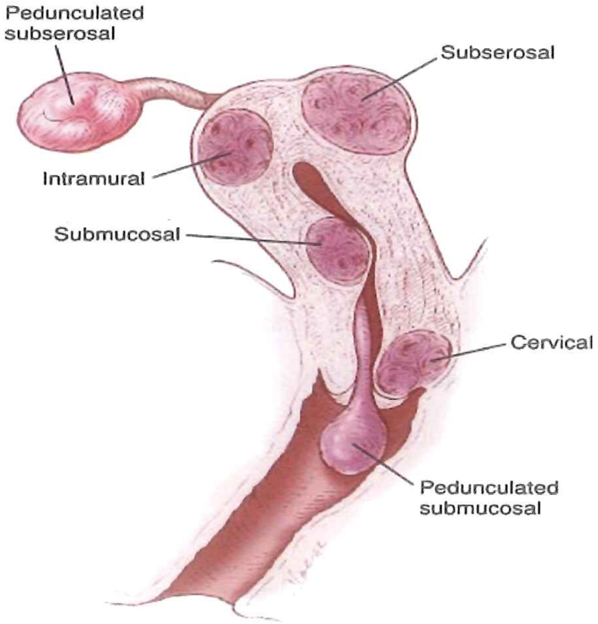
Clinical Complications of fibroid:

- **Torsion** of pedunculated subserous tumors.

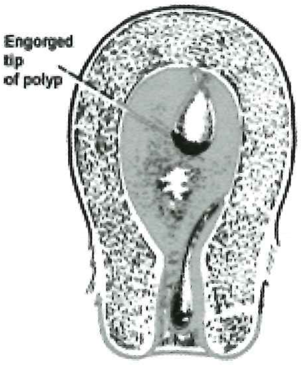
  It presents with acute abdominal pain and may be shock.
- **Rupture of a surface vein** of subserous fibroid. It presents with internal hemorrhage and shock.
- **Inversion** of the uterus in submucous fundal fibroid may rarely occur.
- **Impaction** with pressure symptoms on bladder or rectum in cervical and post. wall myoma. It is more common in premenstrual period due to congestion.
- **Infection** with fever, pain and tenderness over fibroid.
- **During pregnancy:**

  There is greater liability for obstetric complications as:
  - Red degeneration with acute abdominal pain and vomiting.
  - Abortion or preterm labor.
  - Placenta previa.
  - Malpositions and malpresentations.
  - Prolonged labor or obstructed labor.
  - Postpartum hemorrhage due to impaired uterine contractility and higher liability for adherent placenta.
  - Sub involution and puerperal sepsis.

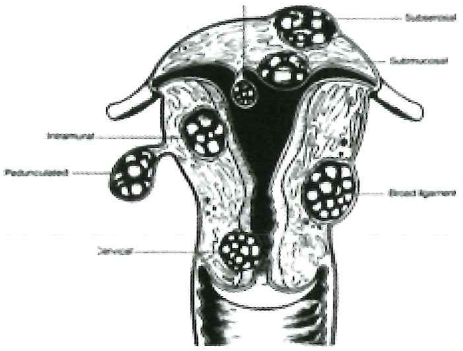
Malignant changes in old age (see before).



Sites of Leiomyomas



Engorged tip of a submucous fibroid polyp



Different sites of uterine fibroids

Clinical picture of fibroid:

More common to present at age group 35-45 years especially nulliparous.

It is more common in dark races and there may b e +ve family history.

Symptoms:

- **No symptoms** (accidentally discovered by ex. and U.S.): mostly in small interstitial and non-pedunculated subserous fibroids.
- **Menstrual irregularities:**

  Menorrhagia, due to:
  - Increased vascularity.
  - Increased surface area of endometrium.
  - Fibroid acts as a mechanical barrier with decreased uterine contractility.

  ***Metrorrhagia*, due to:**
  - Infected or necrosed tip of fibroid polyp.
  - Contact bleeding may occur if the polyp is protruding into the vagina.
- **Congestive dysmenorrhea** due to pelvic congestion**.**
- **Leucorrhea** due to pelvic congestion may be offensive discharge in infected polyp**.**
- **Infertility:** The relation is unclear; it may be responsible for recurrent abortion rather than infertility.

  Possible causes are:
  - *Uterus*: submucous fibroids distort uterine cavity and prevent implantation. They also may obstruct uterine ends of fallopian tubes if they are situated near the cornu. Elongation of cervical canal with hostile secretions may occur in cervical polyp.
  - *Tubes:* Kink of the tubes in broad ligament fibroid or associated chronic salpingitis.
- **Mass**: if very large the patient can feel the mass (usually a sign. not a symptom).
- **Pain**: Apart from some colicky pain in submucous polyp or abdominal discomfort in large tumors, pain means complications e.g. :
  - Hyaline deg. (dull ache).
  - Red deg. (acute pain and vomiting in pregnancy).
  - Infection (pain and pyrexia).
  - Torsion (acute pain and may be shock).

- **Pressure symptoms:** Frequency or retention of urine in large interstitial cervical fibroid. Loin pain may occur due to ureteric compression. Edema of L.L may occur due to pressure on pelvic veins in large tumors.

Signs:

- *General ex.*: Pallor suggestive of anemia may be present.
- *Local ex.* :
  - Firm, painless, mobile pelvic or pelvi-abd. swelling.
  - Uterus may be symmetrically enlarged or knobby and irregular.

Differential diagnosis:

- From other pelvi-abd. swellings and causes of symmetrically enlarged uterus e.g. :
  - **Uterine**: pregnancy – hematometra – pyometra – diffuse adenomyosis – metropathia hemorrhagica.
  - **Ovarian** tumors or tubo ovarian abscess.
- Submucous fibroid polyp should be differentiated from other masses protruding from the cervix e.g. mucus polyp, malignant polyp or incomplete abortion.

Special investigations:

Investigation to document diagnosis:

- U.S. (abdominal or vaginal): It is the most important.
- Sono hystrography or hystoscopy may be done to visualize small submucous polypi.
- H.S.G. it is done in infertile patients to detect tubal patency before surgery. In submucous fibroid there is a filling defect with uterine enlargement.

Investigations to detect complications:

- Fractional curettage may be done in some cases to exclude endometrial hyperplasia or malignancy.
- I.V.P.: in cervical or broad ligament fibroid to check ureteric compression.

Investigations to prepare the patient for operation (to check surgical fitness): e.g. C.B.C – blood sugar – kidney functions – liver functions – ECG in elderly females

Special types of fibroid:

Cervical fibroid

Incidence: 4%, usually single.

Pathology:

- Arises from portio vaginalis or supra vaginal part of the cervix.
- Portio vaginal cervical fibroid tends to project in vagina as fibroid polyp (infective discharge, contact or irregular bleeding & infertility may occur).
- Supra vaginal cervical fibroid tends to be interstitial type, usually central, expanding the cervix in all directions causing pressure symptoms with no menstrual irregularities.

Symptoms:

- Usually no irregular bleeding, occasionally contact bleeding or repeated attacks of metrorrhagia occur with necrosed tip of cervical fibroid polyp.
- Vaginal discharge and dyspareunia due to infected polyp.
- The main presenting symptoms of large interstitial cervical fibroid are pressure symptoms.
- Infertility due to :
  - Elongation of cervical canal in interstitial cervical fibroid.
  - Infected polyp with hostile secretions.

Signs:

- Polyp: Felt by P.V. or seen by a speculum.
- Interstitial fibroid: Bimanual ex.: there is fixed uniform cervical swelling and uterus is displaced upward.
- By a sound elongation of cervical canal is detected.

Specific investigations:

- Ultrasound is confirmatory.
- I.V.P may be done in large interstitial cervical fibroid to detect ureteric compression or deviation. This will help to decide urgency for treatment and prevents ureteric injury during surgery.

Treatment:

- Vaginal myomectomy in polypi protruding in vagina (see later).
- Abdominal myomectomy (difficult) or hysterectomy in large interstitial cervical fibroid (see later).

Broad ligament Fibroid

Pathology:

- True: arises from smooth muscles of broad ligament.
- False: arises from lateral wall of the uterus and burrows in the broad lig.

Symptoms:

- No menstrual irregularities, only pressure symptoms on ureter.

Signs:

- Firm mass displacing the uterus to the opposite side is felt by bimanual examination.

Specific investigations:

- Ultrasound is usually confirmatory. I.V.P. should be done prior surgery to avoid ureteric injury.

Treatment:

- Abdominal myomectomy after opening the broad ligament. Great care is done to avoid ureteric injury.

Treatment of fibroid:

Depends on

- **Patient**: Age, Parity, Severity of symptoms, Pregnancy.
- **Tumor**: Site, Size, Number, Suspect of malignancy.

[I] No treatment: for asymptomatic cases

Except:

- Large tumor (> 14 weeks).
- Rapidly growing, with suspected malignancy.
- Large pedunculated subserous fibroid as torsion may occur.
- Evidence of ureteric compression with renal impairment as in large cervical or broad ligament fibroid.
- Distorting the uterine cavity in nulliparous females as infertility or habitual abortion may occur.
- Asymptomatic intramural fibroids >3cm size should be removed 1st in infertile cases undergoing I.V.F. as this improves the success rate.

[II] Conservative ttt:

For cases near menopause with mild symptoms.

- Non-steroidal-anti-inflammatory drugs (NSADIS) may help to alleviate pelvic discomfort and menorrhagia.
- Progestagens may induce atrophic changes in endometrium and help to regulate menstrual troubles.
- GnRH analogues: Pseudo menopause with atrophy of the tumor occurs. long term use causes osteoporosis. They could be used as preoperative preparation to facilitate surgery as size and vascularity of the tumor decrease markedly.

[III] Surgical ttt:

A) Myomectomy:

Indications: to preserve the uterus in young patients desiring pregnancy.

Complications (mainly for abdominal operations):

In addition to usual surgical risks, myomectomy is considered more hazardous than hysterectomy due to:

- Higher mortality due to increased blood loss.
- Higher morbidity due to post-operative adhesions. This may cause infertility or even intestinal obstruction especially in post wall incisions.
- As the uterus is left there is higher incidence of :
  - Scar rupture on following labors.
  - Recurrence

Types of myomectomy:

- **Vaginal mymectomy (Vaginal polypectomy) :**

  Twist or ligate the pedicle. If large, remove it piece meal i.e. morecellation.

- **Abdominal myomectomy** :
  - Blood transfusion should be available (bloody operation).

- Operation is preferably done in the post menstrual period as there is less vascularity.

- **Hysteroscopic myomectomy**:
  - It is used for submucus fibroids 5cm or less with at least 50% of its size protrudes into cavity.
  - Advantages: No scar and rapid post-operative recovery.
- **Laparoscopic myomectomy:**

- It is used for pedunculated subserous fibroids, some interstitial fibrosis e.g. small number (<4) and small sized (< 6cm).
- Advantages: No abdominal scar, better post-operative recovery and less post-operative adhesions.

B) Hysterectomy:

It is done in cases where myomectomy is contraindicated.

Types:

- Subtotal hysterectomy i.e. uterine body is removed and cervix is left (it must be healthy). It is done in relatively young patients who are sexually active. Advantages: Easier operation, better sexual life as cervical mucus lubricates vagina and less incidence of subsequent vault prolapse. Disadvantages: risk of cervical stump carcinoma is 0.1 to 1%.
- Total hysterectomy: uterine body and cervix are removed.
- Total hysterectomy and bilateral salpingeo-ophorectomy (pan hysterectomy): In cases over 50 years as ovaries are approaching menopause and are potential sites of malignancy.

[IV] Management during pregnancy:

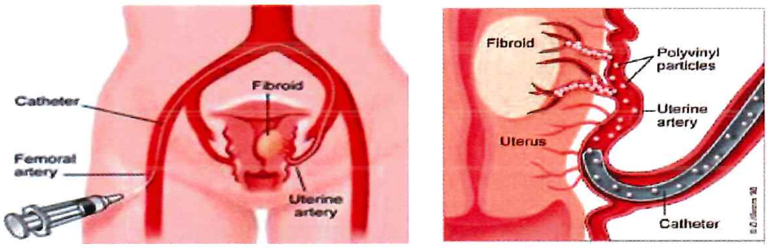
- Myomectomy is contraindicated during pregnancy due to increased vascularity with risk of hemorrhage and pregnancy wastage except pedunculated subserous myoma with torsion (no uterine incision).
- Patient is allowed for vaginal delivery unless obstructed, C.S is done. Myomectomy is contraindicated during C.S.

N.B. Other recent therapeutic modalities: Not a standard treatment but may be used selectively in some centers for patients refusing or unfit for surgery e.g.:

Uterine artery embolization: Recent trend of interventional radiology where catheterization of uterine artery is done to induce vascular embolization with shrinkage of uterus and myomas.

Laparoscopic myolysis: Using laser or coagulation current or cryo-myolysis. Uterus becomes weaker with more liability to rupture.

M.R.I guided focused ultrasound: This use the U.S.generated heat to destroy the myoma after precise localization by M.R.I



Uterine Artery Embolization

Endometriosis

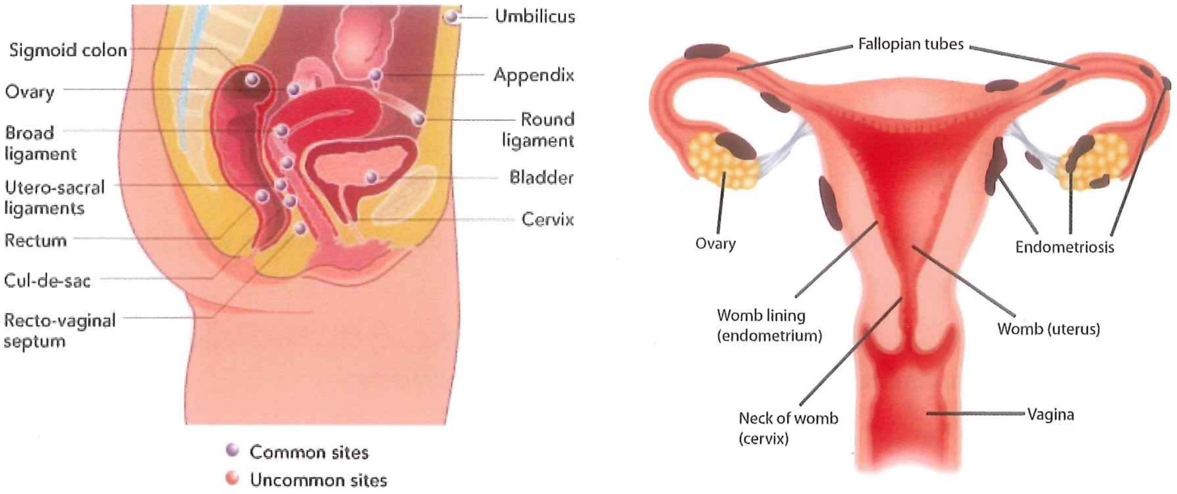
Definition:

Presence of endometrial glands and stroma in abnormal sites:

Sites of endometriosis:

A) **Pelvic sites:** Douglas pouch, uterosacral lig, ovaries, parametrium….

B) **Extra-pelvic sites:** umbilicus, laparotomy scars, other viscera….


Sigmoid colon
Ovary
Broad ligament
Utero-sacral ligaments
Rectum
Cul-de-sac
Recto-vaginal septum
Umbilicus
Appendix
Round ligament
Bladder
Cervix
● Common sites
● Uncommon sites
Fallopian tubes
Ovary
Endometriosis
Womb lining (endometrium)
Womb (uterus)
Neck of womb (cervix)
Vagina

Sites of Pelvic Endometriosis

Etiology:

Not known precisely but there are possible theories:

- ***Sampson tubal retrograde menstruation theory***: Fragments of endometrium implant in the pelvis through retrograde menstruation. This explains higher incidence of endometriosis in cases with outflow obstruction, e.g., imperforate hymen or transverse vaginal septum (increased retrograde menstruation).

  Against this theory that it does not explain extra pelvic endometriosis.
- ***Halban theory, Blood and lymphatic spread*** of endometrial tissue.
- ***Meyers serosal metaplasia theory:*** The peritoneal epithelium can undergo metaplasia into uterine epithelium in response to abnormal stimulus e.g., infection.
- ***Immunologic theory:*** Recently, a defect in the immune response (mostly in cell mediated immunity) had been claimed to be an etiological factor that allows the ectopic foci of endometrium to survive and not to be destroyed by phagocytosis.

Predisposing Factors:

- Excess estrogen may be the stimulus of growth to the ectopic endometrium. It is usually associated with cystic ovaries endometrial hyperplasia or uterine fibroids.

Pathology:

- Blood filled patches or cysts (chocolate or tarry cysts) are usually present with resultant adhesions.
- The pelvis may show marked adhesions (frozen pelvis) with fixed retroversion of the uterus.

Clinical picture:

Incidence: it is present in about 20% in infertile patients.

Age: About 30 years

Parity: Nullipara or low parity usually.

Symptoms: Classic cases present by ***pain*** and ***infertility***.

Pain:

Types:

- Dysmenorrhea: Starts few days before the period due to congestion, increases with its onset due to distension of ectopic glands with blood and diminishes gradually after the end of menstruation due to absorption of blood.
- Dyspareunia: if the recto vaginal septum is involved. It is present also in cases with fixed retroversion as the ovaries are usually prolapsed in Douglas pouch.
- Special types of pain: according to the site of involvement, e.g., cyclic bladder pain associated with hematuria, rectal pain and tenesmus associated with rectal bleeding.

Infertility:

The actual cause is not precisely known but it may be due to:

- Pelvic adhesions surrounding the tubes and ovaries (the most evident cause).
- Increased peritoneal and tubal macrophages that phagocytes the sperms.
- Disturbed ovarian function (altered follicular rupture or corpus luteum function) and tubal motility. This might occur due to excess prostaglandins production by the ectopic endometrium.

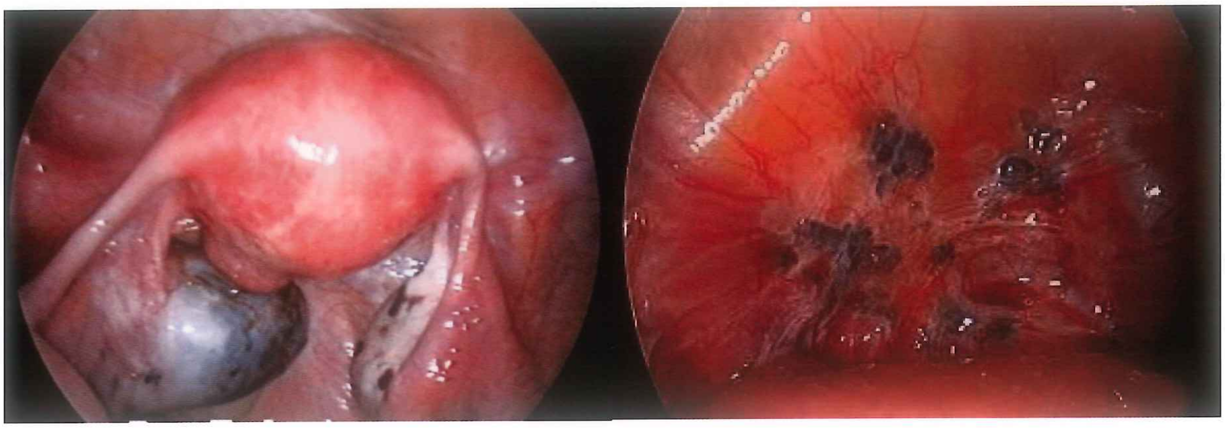
Signs:

Examination is not specific as in many cases no abnormality could be detected however; the following signs may be present:

- Uterus may be retroverted and fixed.
- Ovaries may be large, cystic, and tender and may be fixed in Douglas pouch.
- Nodules could be felt in Douglas pouch.

Special investigations:

- It is a laparoscopic diagnosis; also the severity of disease could be assessed by laparoscope (according to the American-Fertility Society Classification with a scoring system to evaluate the case).
- Cystoscope or proctoscope may be needed if the presenting symptom is hematuria or bleeding per rectum (to exclude other cause e.g., malignancy).
- Histopathologic examination of excised lesions from vulva, umbilicus or scars may be needed.
- Elevated C.A. 125 (tumor antigen) could be used for initial diagnosis and follow up of cases after ttt.



Pelvic endometriosis by Laparoscopy

Differential Diagnosis:

- Ovarian endometriosis is differentiated from inflammatory tubo-ovarian enlargement (past history of salpingeo-oophoritis).
- Nodules of Douglas pouch may be due to endometriosis, T.B. or secondaries of malignancy.

Treatment:

A) Expectant treatment: as analgesics.

Indications:

- Young newly married cases desiring pregnancy with small lesions and minimal symptoms (investigate and treat other causes of infertility).
- Patients near menopause with mild symptoms.

B) Hormonal treatment:

Indications: Cases with marked symptoms and scattered pelvic nodules.

Types used:

- Progestagens: This produces a state of pseudo pregnancy with subsequent regression of endometriosis. The patient has amenorrhea during the course of treatment.
- Oral contraceptive pills with high progestational properties could be used continuously to produce pseudo pregnancy and amenorrhea.
- Gonadotropin releasing hormone analogue (GnRH, LHRHa): For 6 - 9 months to produce a state of pseudo-menopause.
- In infertile cases:
    - Induction of ovulation if cycles are anovular hoping spontaneous pregnancy to occur.
    - I.V.F is a good alternative but success rate is also limited.
    - Large endometrioma more than 4cm needs laparoscopic ovarian cystectomy, while smaller cysts are medically treated.

C) Surgical treatment:

- Laparoscopic surgery: coagulation of endometrial foci, ovarian cystectomy for chocolate cysts or cutting peri-tubal adhesions (salpingeolyses) could be done in infertile patients.
- Laparotomy could be done with excision of localized large masses (conservative surgery) or pan hysterectomy is done in old patients.

Adenomyosis

It occurs in multiparous women around 40 years.

Etiology: ***Cullen's diverticular theory:*** some endometrial glands grow deeply between the muscle fibers during uterine involution in repeated pregnancies.

Pathology: Uterus is symmetrically enlarged, due to diffuse thickening of the muscles.

Localized area of adenomyosis may be present in the uterus which could be mistaken clinically as a fibroid but pathologically there is absent capsule.

Symptoms: Chronic pelvic pain, congestive dysmenorrhea and premenopausal menorrhagia.

Signs: Symmetrically enlarged uterus and tender (Halban sign) , rarely localized bulge.

Differential diagnosis: from other causes of symmetrically enlarged uterus e.g., pregnancy, fibroid, metropathia hemorrhagica, hematometra, pyometra.

Specific investigations: U.S will reveal enlarged uterus with thick muscle wall and blood filled cysts.

Treatment: Symptomatic treatment for pain (analgesics) and bleeding (cyclic progestagens) or hysterectomy as a definitive treatment.

Carcinoma of the body of the uterus (Endometrial Carcinoma)

Endometrial cancer

Pathology:

- **Age:**
  - Higher incidence in postmenopausal females (55-60 years).
  - Rare (<5%) it occurs in young age (< 40 years) in cases with untreated Polycystic ovarian disease (P.C.O.) due to prolonged unopposed estrogen.
- **Parity:** Higher incidence in nullipara or low parity.

- **Corpus cancer syndrome:** Frequent association of hypertension – diabetes obesity and endometrial carcinoma.

This is may be due to:

- Postmenopausal females are usually obese with diabetes and hypertension.
- Increased peripheral conversion of suprarenal androgen (androstendione) to estrone (E_3) in fat of obese females leading to prolonged unopposed estrogen effect.

Predisposing factors:

Prolonged unopposed E.:

- Females with delayed menopause (> 55 years).
- Exogenous estrogen therapy for treatment of menopausal symptoms. Other drugs as tamoxifen used in cancer breast as it has some estrogenic effect on the endometrium.
- Excess endogenous estrogen e.g. obese postmenopausal females, cases with untreated P.C.O., estrogen producing ovarian tumors and cases with liver cirrhosis due to decreased estrogen clearance from the body.

Precancerous lesions:

Endometrial hyperplasia

Definition: It is proliferation of endometrial glands and stroma.

Etiology: Prolonged unopposed estrogen (see before).

Types: It is a pathological term.

It is either:

- *Simple type:* The glandular stroma ratio (g/s) is preserved. Some glands may be obstructed and dilated with Swiss cheese appearance (cystic glandular hyperplasia). Malignant potential is 1%. Atypical changes may occur as pleomorphism, hyperchromatism and increased mitotic activities (simple hyperplasia with atypia). Malignant transformation is 9%.
- *Complex (adenomatous) type:* Excessive glandular proliferation with minimal stroma (glands are arranged back-to-back). Malignant transformation is 3%. Atypical changes may occur as pleomorphism, hyperchromatism and increased mitotic activities (atypical complex or atypical adenomatous hyperplasia). Malignant transformation is 29%.

Diagnosis: It presents clinically with irregular vaginal bleeding, usually post menopausal bleeding or may be premenopausal metrorrhagia. Vaginal U.S reveals thick endometrial lining and it is confirmed by fractional curettage.

Treatment: In young patients desiring pregnancy, high dose progestagen therapy. Repeat curettage may be needed to confirm cure. In older cases hysterectomy is preferred especially if atypia is present

Cancerous (malignant lesion):

Gross Picture:

- Uterine fundus is the most common site.
- Fungating, necrotic, hemorrhagic, friable mass in the endometrium which invades the muscle wall later on.
- It is either localized or diffuses spreading over the whole endometrium.

Microscopic Picture:

- Adeno-carcinoma (The commonest type).
- Adeno-acanthoma: malignant glands with benign squamous epith. (due to previous metaplasia).
- Adeno-squamous carcinoma: both glands and sq. epith. are malignant.
- Rare types : Papillary adeno carcinoma, Pure squamous cell carcinoma, Mucinous adeno carcinoma, Clear cell carcinoma.

- ***Grading endometrial carcinoma:***

Grade I**:** highly differentiated (glandular pattern is preserved).

Grade II**:** Differentiated with some solid areas.

Grade III**:** Undifferentiated with dominant solid areas.

- ***Methods of spread:***

Usually a slowly growing tumour.

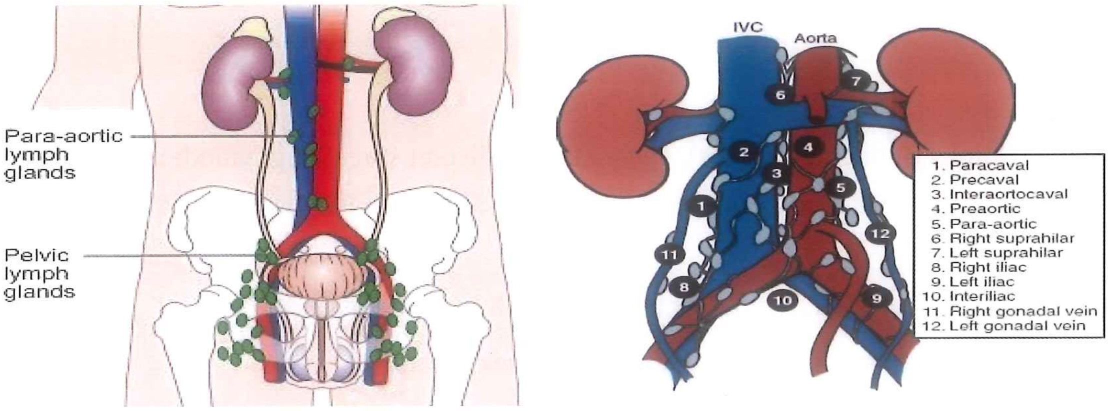
Direct spread **(commonest and also delayed)**: It invades the muscle wall of the uterus (perforation may occur). Downward spread to cervix and vagina, ant. spread to bladder and post. to rectum.

Lymphatic spread: (usually late).

- The upper part drains to para aortic L.N (with the ovary).
- The lower part drains to ext. iliac, int. iliac and common iliac (with the cervix).

- The cornu drains into superficial inguinal L.N. (along the round lig.).
- Lymphatic spread may also occur to tubes, ovaries and vagina.

Blood born spread: (very late) to liver, lung, bone or brain. Also retrograde vascular spread to vagina may occur.


Para-aortic lymph glands
Pelvic lymph glands
IVC
Aorta
1
2
3
4
5
6
7
8
9
10
11
12
1. Paracaval
2. Precaval
3. Interaortocaval
4. Preaortic
5. Para-aortic
6. Right suprahilar
7. Left suprahilar
8. Right iliac
9. Left iliac
10. Interiliac
11. Right gonadal vein
12. Left gonadal vein

Lymphatic spread of EC

■ *Pathological complications and cause of death:*

- Hemorrhage.
- Infection in the form of pyometra or peritonitis if perforation occurred.
- Bladder and rectal fistula.
- Distant spread to vital organs.

■ *Staging of endometrial carcinoma (FIGO staging)*:

It is a surgical staging in which laparotomy is done for every case with aspiration of ascites (if present) or peritoneal wash and aspirate to detect malignant cells. Abd. pan hysterectomy and L.N sampling are done.

Additional ttt depends mainly on path. ex. of the specimen to detect depth of myometrial invasion.

Stage (I): *Carcinoma confined to the uterine body*:

a: Invasion of less than ½ the myometrium.

b: Invasion of more than ½ the myometrium.

Stage (2)*: Carcinoma extending to the cervix (stroma)*:

Stage (3): *Extension outside the uterus but not outside the true pelvis.* e.g. +ve cytology and or adnexa (a), vagina (b), L.N affection (c).

Stage (4): *Distant spread.*

Diagnosis:

Early diagnosis:

i.e. before clinical symptoms appear by screening of old females especially high risk cases with unopposed estrogen level. It is not reliable as screening programs of cancer cervix.

Vaginal U.S.: To detect endometrial thickness in post-menopausal females. If more than 5mm, curettage is considered.

Endometrial biopsy: by FC (Fractional Curettage, or hysteroscopic biopsy)

Clinical Picture of endometrial carcinoma:

Symptoms:

- Irregular bleeding (post-menopausal in over 75% of cases). Also premenopausal metrorrhagia may be present.
- Discharge: usually offensive.
- Late cases present by pain and cachexia.

Signs:

- *Generally*:

  Manifestations of anemia (pallor), cachexia and distant spread e.g. jaundice or pathological fracture.

- *Abdominally*:
  - Liver enlargement with nodules or ascites due to liver metastases.
  - Rarely, pelvi-abd. mass due to pyometra may be present.
- *Bimanual ex.*:

  Uterus may be symmetrically enlarged and tender in pyometra. The uterus may be felt as normal sized, slightly larger or slightly smaller (due to postmenopausal atrophy).

Special Investigations:

Investigations to document diagnosis: F.C. – hysteroscope could be used to detect site of lesion and to take guided biopsies. The curetting is plentiful, friable and necrotic.

Investigations to detect complications (spread):

- X-ray lung for metastatic nodules.
- Liver and bone scar for metastases.
- CT or MRI could be done to detect myometrial infiltration and abdominal L.N.

Investigations to prepare the patient for surgery (to check surgical fitness): …….

Differential diagnosis:

- From other causes of post-menopausal bleeding e.g. senile vaginitis, malignancy of cervix, vagina or functioning ovarian tumors.
- In relatively young patients, from other causes of premenopausal bleeding as dysfunctional uterine bleeding or fibroid.

N.B.: Any case of post-menopausal bleeding should be considered malignant till proved otherwise.

Treatment:

A) Prevention:

- Screening for post-menopausal females (see before).
- Proper management of cases with endometrial hyperplasia (see before).
- If estrogen is given as a replacement therapy, progestagens should be added in the 2nd half of the cycle.
- Cases with chronic anovulation should be treated (either by induction of ovulation or repeated courses of progestagens).

B) Actual treatment:

- *Surgery*: Total abdominal hysterectomy and bilateral salpingeo ophorectomy and L.N sampling are done during the surgical staging.
- *Post-operative additional treatment* : It is based on surgical and pathological factors which determine prognosis as :
  - Stage: Poor prognosis with advanced stage.
  - Depth of myometrial invasion. It is an important factor. It increases the risk of extra uterine spread.
  - Grade: Poor prognosis with undifferentiated tumors.
  - L.N. affection and peritoneal cytology: Poor prognosis with +ve L.N affection or +ve cancer cells in peritoneal fluid.
  - Other factors: Tumor size and progesterone receptors in the tumor.

N.B.: Prognosis is usually more favorable than cancer cervix.

- *According to operative and pathological findings*:

Stage (I):

- Early cases with endometrial involvement only and tumor is well or moderately differentiated: surgery is enough.

N.B.: Radiotherapy alone (internal and external) could be used as a single ttt for surgically unfit cases but the prognosis is much more less than cases of cancer cervix.

Stage (II): The operation could be extended to be radical hysterectomy (Wertheim's operation), however, it is preferable to be ttt as stage (I) as the patient is usually old, obese with hypertension and diabetes, so most cases cannot tolerate major surgical interference as Wertheim's operation.

Stage (III): Radiotherapy is preferable to surgery.

Stage (IV :

- Palliative radiotherapy.
- Palliative chemotherapy.
- Measures to relieve pain.

Removal of the uterus in these cases at the initial step of surgical staging can help to remove a source of bleeding and infection, so they can tolerate other measures of radio or chemotherapy.

Sarcoma and Mixed mesodermal tumorsof the Uterus (Very rare)

Corporeal sarcoma:

This may arise from the uterine muscles, either de novo or on top of benign leiomyoma (less than 0.1%). Sarcoma may also arise from the endometrial stroma (endometrial stromal tumors).

These tumors grow rapidly even after menopause.

Invasion of myometrium and distant blood spread are common.

Bleeding, pelvic pain with rapid uterine enlargement are common presentations.

Diagnosis and treatment: as endometrial carcinoma. Total abdominal hysterectomy and bilateral salpingeo-ophorectomy followed by post operative radiotherapy but prognosis is poor.

Chorio-Carcinoma of the Uterus

(Refer to Obstetric Book)

Carcinoma of the Cervix

Incidence:

- It was the commonest malignant tumor of the female genital tract; however, incidence is decreasing with increased incidence of endometrial carcinoma. This is explained by:

  - Decreased incidence of cancer cervix due to early detection and treatment of precancerous lesions and the use of HPV vaccine.

  - Increased incidence of endometrial carcinoma due to increased longevity of population and frequent use of estrogen as a replacement therapy.

Risk factors:

- *Age*: Average is about 45 – 50 years.
- *Parity:* More common in multipara.
- *Socioeconomic class:* More common in low socio-economic classes as it is commonly associated with multiparity and lack of genital hygiene.
- *Sexual factor*: The most important factor:

  Male: Uncircumcised male due to irritation of cervix by the male smegma, so it is less common in Moslems and Jews due to routine circumcision.

  Female: - Early age of 1st intercourse as there is maximum metaplasia at the age of puberty. If irritation by infections or DNA of sperms occurs, dysplasia may develop and later on malignancy.

  - Multiple sex partners due to higher incidence of sexually transmitted diseases. Also DNA of sperms is suggested to be a factor.

- *Heavy smoking:* Had been suggested to be carcinogenic on the cervix. This might be attributed to decreased immunity.

Predisposing factors:

- Sexually transmitted diseases as human papilloma virus (especially types 16 18, 31, 33, 35), and herpes simplex virus type II.

Precancerous Lesions:

Cervical intraepithelial neoplasia (CIN). Recently it is termed squamous intraepithelial lesions (SIL).

Definition:

Basal cell hyperplasia with atypical changes in the cells but without invasion of the basement membrane and with preservation of normal cellular stratification.

Age incidence: It may occur at any age but commonest between 25 and 45ys.

Site of origin:

It usually arises from the transformation zone, which is a region in ectocervix originally covered by columnar epithelium and by a process of metaplasia of sub columnar reserve cells had been changed into stratified squamous epithelium.

Physiological background:

This process occurs during life and is maximum at puberty. Maturation of transformation zone means complete replacement with stratified squamous epithelium. It connects above with the cervical canal at the squamo-columnar junction.

Pathogenesis:

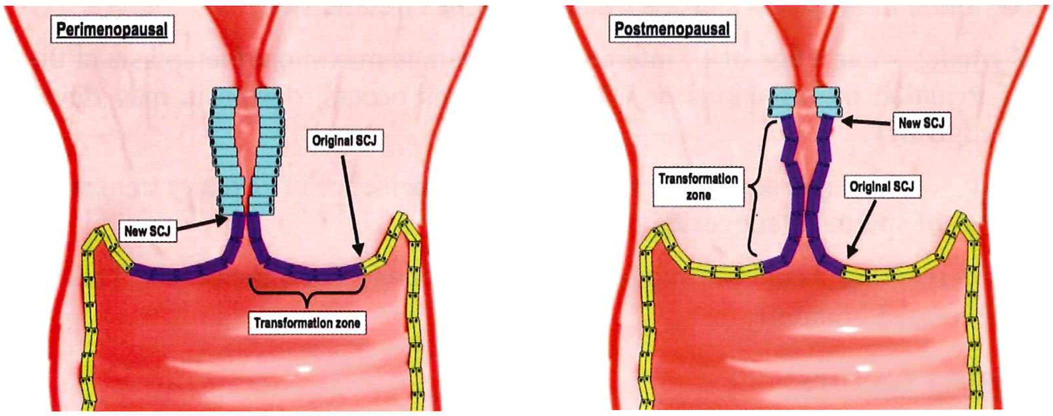
If the epithelium is exposed to an irritant during this normal metaplasia, e.g., infections and DNA of sperms, abnormal proliferation (dysplasia) may occur.

Microscopic Picture:

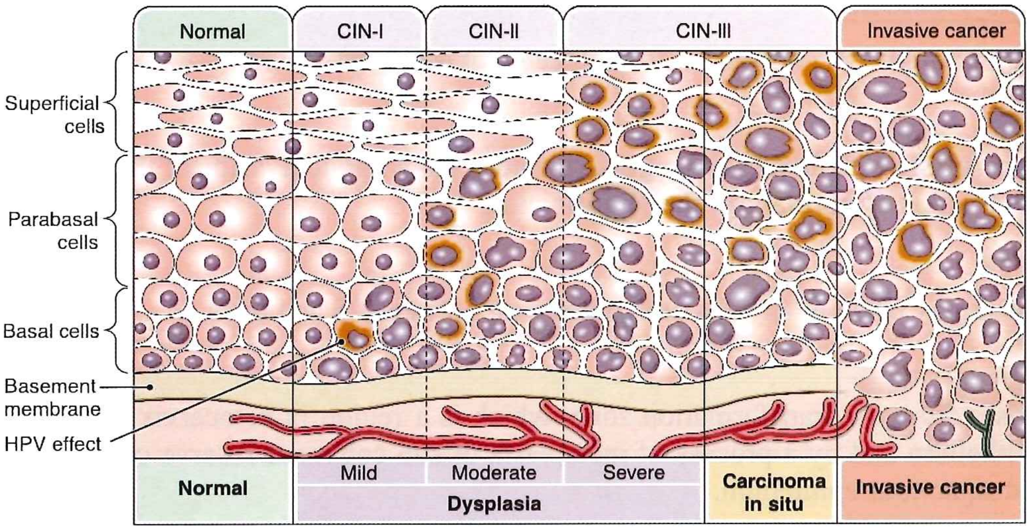
Atypical cells, i.e., showing pleomorphism, hyper-chromatism, increased mitotic activities, but no invasion of the basement membrane and stratification is normal. The number of mitotic activities correlates well with virulence and liability for malignant transformation.

According to the depth of involvement, it is divided into:

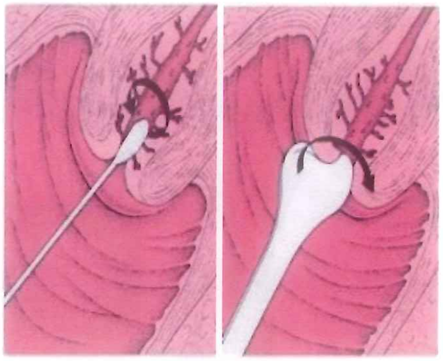
- Mild CIN (grade I) or LSIL: only lower 1/3 of the epithelium is involved.
- Moderate CIN (grade II) or HSIL: lower 2/3 of epithelium is involved.
- Severe CIN (grade III) or HSIL: The whole epithelium is involved. Carcinoma in situ occurs if the stratification of the cells becomes abnormal (some use C.I.N III & C.I.S. as synonymous).


Perimenopausal
Original SCJ
New SCJ
Transformation zone
Postmenopausal
New SCJ
Transformation zone
Original SCJ

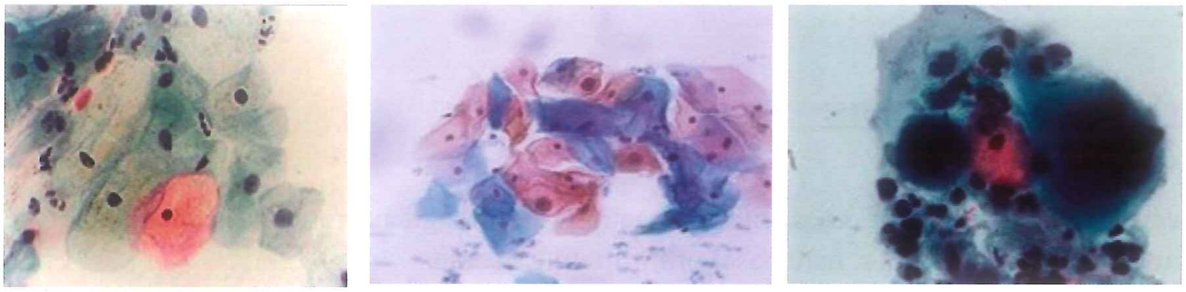
Transformation Zone


Normal
CIN-I
CIN-II
CIN-III
Invasive cancer
Superficial cells
Parabasal cells
Basal cells
Basement membrane
HPV effect
Normal
Mild
Moderate
Severe
Dysplasia
Carcinoma in situ
Invasive cancer

Histologic grading of CIN



Pap Smear



Normal Pap Smear *Mild dysplasia* *Severe Dysplasia*

Diagnosis:

- Usually no clinical symptoms, may be contact bleeding or leucorrhea.
- By examination the cervix may appear normal or suspicious cervix is detected.
- It is usually diagnosed during routine screening (see later).

Treatment:

- Mild cases (LSIL, CIN 1):

Tend to regress, so treatment of infections and close follow up are done.

- Moderate cases (CIN 2, HSIL):

-Ablation therapy i.e. destruction of the lesion with a safety margin. This could be done by diathermy cautery, cryocautery or laser vaporization.

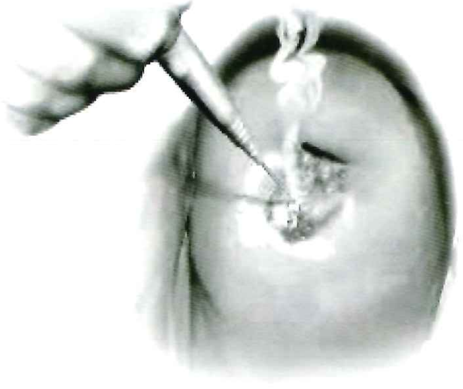
- Excision of the whole transformation zone using a special electric loop is done (loop electrosurgical excision procedure LEEP).

- Severe cases and carcinoma in situ (CIN 3, HSIL):

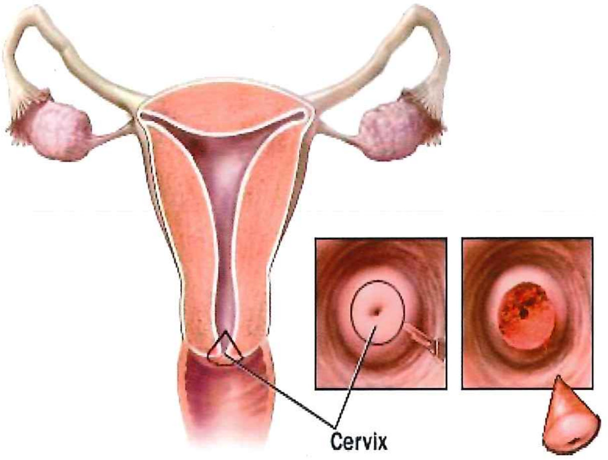
-Young patients (desiring pregnancy): conization.

-Old patients: total (or pan) hysterectomy.

- During pregnancy: Diagnosis and treatment of CIN and even C.I.S should be delayed till 3 months after labor as in pregnancy there are some atypical changes in cervical cells which regress after.



Diathermy destruction of CIN

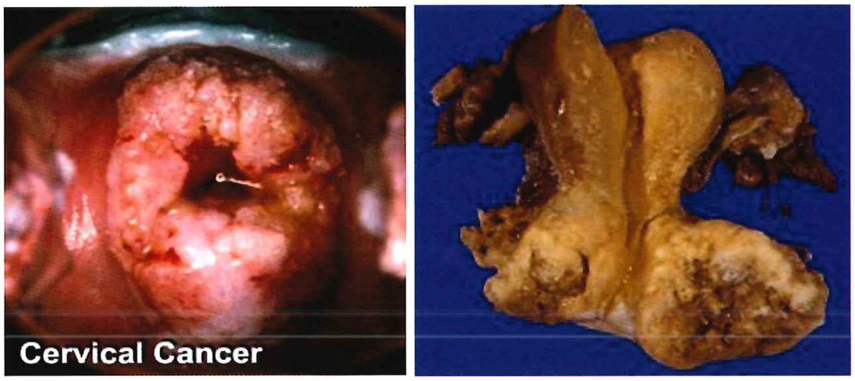


Cold knife excision of TZ

Cancerous (Malignant) Lesions:

Gross picture:

- Ectocervical (85%): Most of cases, either fungating hemorrhagic necrotic mass, malignant ulcer (everted edges, necrotic floor, hard base) or infiltrating nodule.
- Endocervical (15%): It distends the cervix (barrel shaped) with no apparent growth at external os (delayed diagnosis – usually radio resistant – worse in prognosis).



Cervical cancer

Microscopic picture:

- Squamous cell carcinoma : >85% it arises from the stratified squamous epithelium of the ectocervix but it may arise in the endocervix due to previous metaplasia (as a result of repeated infections).
- Adeno carcinoma : <15%, arises from the columnar epithelium of the endocervix. Rarely may arise from ectocervix on top of cervical erosion.

Degree (grading) of malignancy:

- Broder's classification :
  - Grade I : less than 5% undifferentiated cells.
  - Grade II : 5 – 50% undifferentiated cells.
  - Grade III : more than 50% undifferentiated cells.

Methods of Spread:

- *Direct spread:*
  - Upwards: body of uterus.
  - Downwards: Vagina.
  - Ant.: Bladder.
  - Post. : Rectum (along utero-sacral lig.).
  - Lat.: Parametrium. It compresses the ureter causing uremia (commonest cause of death).
- *Lymphatic spread (commonest way of spread-occurs early):*

1ry group of L.N:

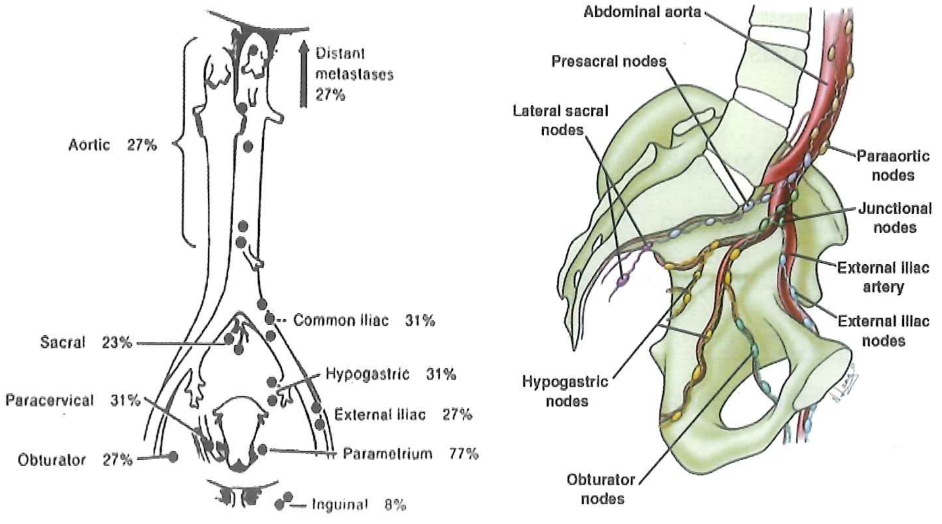
- Parametrial L.N. which are small nodes present in the parametrial C.T. around the cervix.
- Paracervical L.N. at crossing of the ureter by uterine artery.
- Obturator L.N. surrounding the obturator vessels and nerves.
- Ext. iliac L.N.
- Int. iliac L.N.

2ry group of L.N.: (it drains the 1ry group)

- Lat. sacral L.N. along utero-sacral lig.
- Common iliac L.N.
- Para-aortic L.N.

- ***Blood born spread:***

  Late- to liver, lung, bone and brain.


Distant metastases 27%
Aortic 27%
Common iliac 31%
Sacral 23%
Hypogastric 31%
Paracervical 31%
External iliac 27%
Obturator 27%
Parametrium 77%
Inguinal 8%
Abdominal aorta
Presacral nodes
Lateral sacral nodes
Paraaortic nodes
Junctional nodes
External iliac artery
External iliac nodes
Hypogastric nodes
Obturator nodes

Lymphatic drainage and spread of cancer cervix

Pathological complications and causes of death:

- Uremia.
- Infection.
- Hemorrhage.
- Distant metastases to vital organs with cardiac and pulmonary complications.

Staging of cancer cervix: (FIGO clinical staging)

- ***Stage (0):*** Carcinoma in situ.
- ***Stage (I)***: Confined to cervix:
  - 1 (a): Micro invasive: stroma invasion is less than 5mm from basement membrane and horizontal spread less than 7mm and there is no lymphatic or blood vessel involvement.

    1 (b): Other cases of stage I, i.e., more deep invasion than micro invasive type (spread to uterus is considered stage I).
- ***Stage (II)***: Spread outside the cervix:
  - II (a): Spread to vagina but not reaching the lower 1/3.
  - II (b): Spread to parametrium but not reaching the lat. Pelvic wall.
- ***Stage (III):*** Stage of fixity.
  - III (a): spread to vagina reaching the lower 1/3
  - III (b): Spread to parametrium reaching the lat. pelvic wall. There is no cancer free space between the tumor and lat. pelvic wall. This is usually associated with ureteric compression and hydronephrosis or uremia.
- ***Stage (IV):*** Distant metastases:
  - IV (a): Bladder or rectum.
  - IV (b): Distant (extra-pelvic spread), e.g., lung, liver, bone or brain.

Diagnosis of cancer cervix :

Early detection – clinical picture of invasive lesions (symptoms – signs – differential diagnosis) – special investigations.

Early diagnosis:

This means diagnosis of precancerous cases and early malignant cases before symptoms appear.

In most developed countries, there is an annual screening program (every year in high risk population and every 3 years in low risk population) for females who started sexual activity. It includes the following:

- ***Cytological methods* (Pap smear)**:

Technique: 3 smears are obtained:

- 1st from post. fornix (by pipette or wooden spatula).
- 2nd from ectocervix (by Ayre's spatula).
- 3rd from endocervix (by aspiration of mucus or by swabbing the cervical canal by a dry cotton applicator). Smears are spread on a slide and fixed immediately by immersion in alcohol 95%, and then they are stained by Papanicolaou stain and examined microscopically.

Results: Either benign smear, inflammatory smear, premalignant CIN or malignancy. Sometimes, the smear is suspicious. Treatment of infection is given and it is repeated 4-6 weeks later. If it is still suspicious we proceed to the next investigations (colposcopy and biopsy) as if malignant smear.

Advantages:

- Easy, it screens large area with minimal trauma.
- Early diagnosis.
- Accurate (95%).

o ***Schiller's iodine test*** :

Technique: Cervix is dried from mucus and painted with iodine solution.

Results: Normal squamous cells contain glycogen and will be stained by dark brown color. Unhealthy cells (not necessarily malignant) will not be stained due to absent glycogen.

o ***Colposcope***:

Technique: Magnification of cervix by 25 times after painting with acetic acid to dissolve mucus. The whole squamocolumnar junction (transformation zone) must be visualized to be considered adequate.

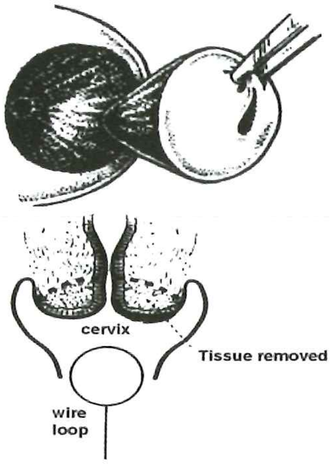
Results: we have to comment upon color tone and vascular pattern. Areas with aceto-white epithelium, punctation or mosaic pattern are considered abnormal. Abnormal vascular pattern as spaghetti or corkscrew are considered highly suspicious for malignancy.

o ***Cervical biopsy:***

The most accurate method to confirm the diagnosis

Types:

- Biopsy from suspicious area to the naked eye (e.g. big. erosion).
- Biopsy from suspicious area by colposcope.
- Four quadrant punch biopsy.
- Cone biopsy: cone shaped piece of cervix is removed with the base downwards at the ectocervix (include most of the transformation zone) and apex upwards (includes the whole cervical canal), serial sections are examined pathologically.
- Fractional curettage (F.C.): It could be done to exclude endocervical carcinoma and associated endometrial carcinoma. At least 2 specimens are taken, the 1st from cervical canal (before dilatation), and the 2nd from the body of the uterus. If the 1st specimen is +ve for malignancy, the case is considered as cancer cervix. If the 2nd one is positive the case is considered endometrial carcinoma.



Cone Biopsy

Clinical Picture of Invasive Carcinoma:

Symptoms:

- *Early cases*: no symptoms.
- *Moderately advanced cases*:
  - Bleeding: contact bleeding after intercourse, vaginal douche or P.V. examination.
  - Discharge: 1st, it is watery and slight, later it is offensive and necrotic.
- *Advanced cases*:
  - Pain: Backache due to infiltration of uterosacral lig.
  - Cachexia: Due to bleeding, infection, uremia and pain.

Signs:

- **Generally**: Manifestations of anemia (pallor), uremia, cachexia or distant metastases e.g., jaundice-pathological fractures.
- **Abdominally**: palpable kidney mass or liver enlargement with nodules. Ascites may be present due to liver affection.
- **Local ex.: (P.V. and speculum ex.).**

  The pathological lesion of the cervix is detected:
  - Ectocervical lesion: Cauliflower fungating mass, malignant ulcer or infiltrating nodule.
  - Endocervical lesion: Barrel shaped cervix, introduction of a sound in the cervix can detect friable mass with enlargement of the cervix but severe bleeding may occur.
  - Uterus may be enlarged due to pyometra.
- **P.R.** is important to detect parametrial infiltration and uterosacral ligament involvement. Parametrial hardening on examination may be due to infection or actual invasion. C.T. or MRI can differentiate both conditions.

Special Investigations:

Investigations to document the diagnosis: The pathology must be confirmed by cervical biopsy.

Investigations to detect complications (spread):

- X-ray lung for metastatic nodules.
- Liver and bone scan for metastases.
- C.T. or M.R.I. could be done to detect parametrial infiltration.
- I.V.P. to detect ureteric compression and to check kidney functions.
- Others as cytoscopy or proctoscopy.

Investigations to prepare the patient for surgery (to check surgical fitness): …..

Treatment of Cancer Cervix:

I) Preventive Measures:

- Routine screening of females above 30 years by cytology.
- Early treatment of C.I.N. and follow up of these cases.

Health education of population for sexual hygiene and routine male circumcision.

II) Actual treatment:

According to the stage of disease:

■ **Stage (0):**

- Young age (desiring pregnancy): Conization could be done.
- Old age: total or pan hysterectomy with removal of a cuff from upper vagina.

■ **Stage (I):**

Radiotherapy or surgery. Both give the same results with about 80 – 85% 5 year survival. In many centers surgery is more preferable as the tumor is totally excised with less incidence of recurrence and sexual activity could be maintained after.

Radiotherapy:

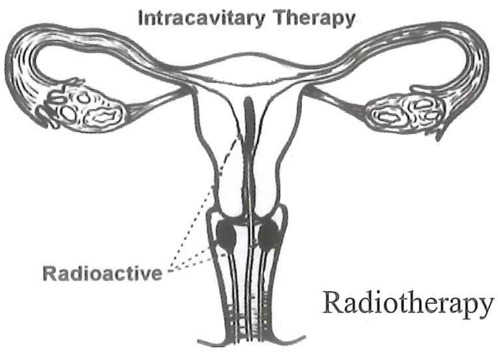
Internal irradiation (Brachytherapy) by packing the uterus, cervix and upper vagina by radium or cesium and external irradiation (Tele- therapy) to the abdomen.

Advantages:

- Low 1ry mortality (less than 1% due to flaring up of infection)
- Could be used for patients unfit for surgery.

Disadvantages:

- Some tumors are radio resistant (especially adeno carcinoma).
- Complications may occur: as Flaring up of infection, Vaginal stenosis and dyspareunia.



Radiotherapy in cervical cancer

Surgery:

Abdominal radical hysterectomy (Wertheim's operation): We remove the following:

- Uterus, tubes, ovaries.
- Upper 1/4 of vagina or at least one inch below the tumor as a safety margin.
- Parametrium.
- Obturator, iliac and L.N.

Disadvantages:

- Higher 1ry morality as it is lengthy and bloody operation.
- Higher 1ry morbidity due to injury of bladder or ureter.
- Some patients are unfit for surgery.

Adjuvant external radiotherapy:

Indications:

- More than 1 +ve L.N affection.
- +ve margins of the surgical specimen.

■ **Stage (II) & (III):** Radiotherapy (internal & external) is the treatment of choice.

■ **Stage (IV):**

- Palliative radiotherapy.
- Measures to relieve pain (e.g. drugs as morphine and codeine, pelvic sympathectomy).

■ ***Treatment during pregnancy***:

- *Before fetal viability:* the same as in non-pregnant state, but if radiotherapy will be used, termination of pregnancy should be done 1st.
- *After fetal viability:* delivery is achieved 1st by C.S. Vaginal delivery is contraindicated (see before). The operation could be completed to caesarian radical hysterectomy or radiotherapy could be used later.

■ ***Stump carcinoma***:

- *Def.*: Carcinoma of cervix left after subtotal hysterectomy.
- *Incidence:* 0.1-1%.
- *Treatment:* Usually of very poor prognosis due to early spread and difficult treatment. Radical surgery could be done. Radiotherapy could also be used with difficulty (see before).

Carcinoma of the Vulva

Incidence:

- Rare.
- Old age (about 65 years).

Predisposing factors:

- Atypical vulval dystrophies (VIN), H.P.V. infection (condyloma acuminata), long lasting lympho granuloma inguinale & granuloma inguinale.
- Chronic irritation of the vulva e.g. previous exposure to irradiation and persistent scratching for years.

Pathology:

- ***Gross***: Commonest site is labia majora (ant. portion), either fungating cauliflower mass or malignant ulcer. Labial kiss ulcer may present as a result of direct contact, lymphatic spread or new developing lesion.
- ***M.P.***: Usually squamous cell carcinoma (differentiated or undifferentiated). Rarely adenocarcinoma of Bartholin gland or malignant melanoma.
- ***Spread of cancer vulva***: Mainly direct spread, then lymphatics & lastly by blood.
  - Direct spread: vagina, urethra, perineum.
  - Lymphatic spread: superficial inguinal & femoral L.N on both sides then deep inguinal & deep femoral L.N. especially upper deep femoral gland (gland of Cloquet) then the ext. iliac L.N.

  N.B.: Some believes that clitoris drains directly to gland of Cloquet.
- ***Staging of cancer vulva: (Surgical FIGO staging).***
  - ***Stage 0***: C.I.S. The whole thickness is replaced by malignant cells without invasion of the basement membrane.
  - ***Stage I***: Confined to vulva, 2cm or less in diameter with no palpable L.N.
  - ***Stage II***: As I, but more than 2 cm in diameter.
  - ***Stage III***: Extension to lower urethra, perineum, anus or enlarged mobile inguinal L.N.
  - ***Stage IV***: Invasion of upper urethra, bladder, pelvic bones or fixed ulcerated L.N. or distant spread.

Diagnosis:

Symptoms:

- Mass or ulcer on vulva.
- Pruritus vulvae.
- Purulent discharge or bleeding.

Signs:

- Malignant ulcer or fungating mass could be detected with associated L.N. enlargement

Specific investigations:

- Routine investigations (to assess general fitness): blood picture, urine analysis, kidney functions, blood sugar & E.C.G.
- Document diagnosis: by excisional biopsy. In the early cases toluidine blue dye and colposcopy examination is done to detect early cases (persistence of the blue color after wash).
- Detect distant spread: X-ray lung, liver & bone scan or others according to the case.

Treatment:

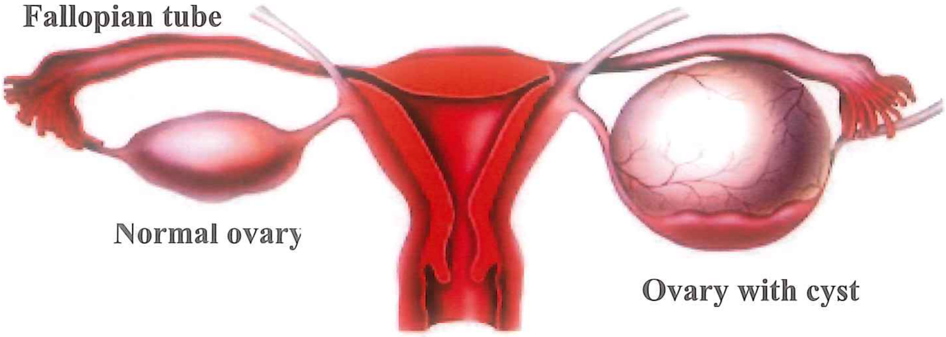
- Stage I: wide local excision.
- Stage II: wide local excision with LN sampling.
- Stage III, IV: vulvectomy through butterfly incision and removal of LNs, has high morbidity and mortality so Radiotherapy may be used as vulval skin is sensitive to irradiation.

Ovarian Swellings

(A) Non Neoplastic Cysts of the Ovary

Ovarian enlargement presenting with adnexal mass is one of the common gynecologic conditions met in practice.

Majority of ovarian swellings are non-neoplastic, however others are neoplastic (benign or malignant).



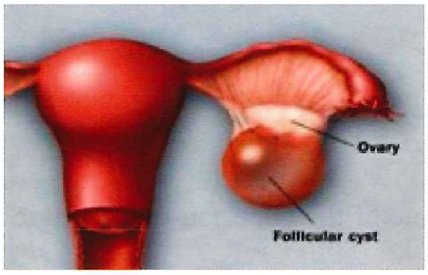
Normal ovary & Cystic ovarian swelling

Etiology:

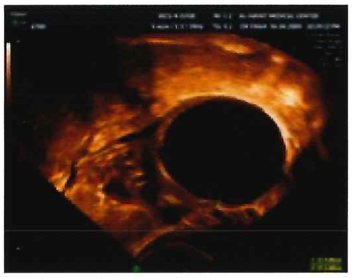
a) Follicular cysts:

- The commonest.
- They represent cystic dilatation of graafian follicle with fluid absorption and cystic appearance. Single or multiple cysts may be present but their size is small (< 7cm). They are lined with granulose and theca cells with no evidence of luteinization.
- Clinical picture:
  - Asymptomatic and discovered by ultrasound (more common to occur with induction of ovulation).
  - May present with menstrual irregularities e.g. amenorrhea or irregular vaginal bleeding (metropathia hemorrhagica).
  - Dull aching pain may be present in one or both iliac fossae. Rarely acute abdominal pain due to torsion of the ovary may occur.
  - Bimanual ex. may reveal adnexal fullness in one or both sides.
- Specific investigations :

  Pelvic ultrasound is the gold standard for diagnosis: uni locular, echo lucent, thin walled cyst with no septations or papillae.



Follicular cyst of the ovary



Follicular cyst by US

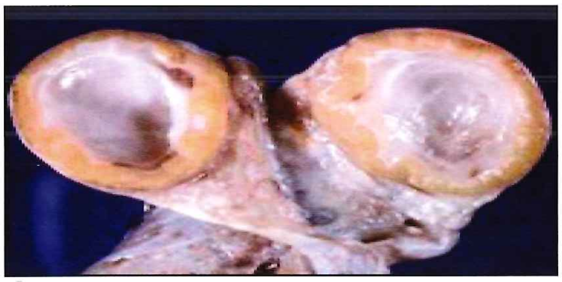
- Differential diagnosis :

Non neoplastic Cyst of the ovaries	Neoplastic ovarian cyst as serous cyst adenoma
○ Common.	○ Less common.
○ Not more than 5-7cm.	○ May reach large size.
○ Menstrual irregularities are common.	○ No menstrual irregularities
○ Follow up: usually diminishes gradually or stationary.	○ Usually grows in size.

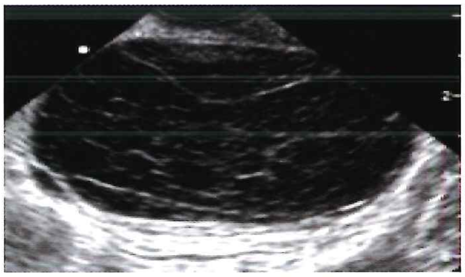
- Treatment:
    - Conservative follow up: regression usually occur.
    - O.C.P. could be used in some cases for 3-6 months to enhance regression or cyclic progestagens could be given to regulate menstrual abnormalities.
    - Rarely surgical management for torsion of the ovary is needed.

b) Corpus luteum cyst:

- Less common than follicular cyst.
- Pathologically: failed degeneration of corpus luteum with cystic dilatation and may be hemorrhage inside. Size is 3-7cm, it secretes progesterone. It could be normally present during 1st trimester of pregnancy.
- Clinical picture:
    - Usually asymptomatic discovered by ultrasound (common during pregnancy).
    - May present with menstrual irregularities as some delay of menstruation.
    - Pain may occur due to hemorrhage inside cyst. Clinical presentation is similar to ectopic tubal pregnancy (amenorrhea followed by pain and mild vaginal bleeding).
    - Rupture of cyst with persistent bleeding into peritoneal cavity may rarely occur with evidence of hypovolemic shock.
    - Specific investigations: Pelvic U.S is usually diagnostic, BhcG or laparoscopy may be needed to differentiate from ectopic tubal pregnancy.



Corpus luteum cyst



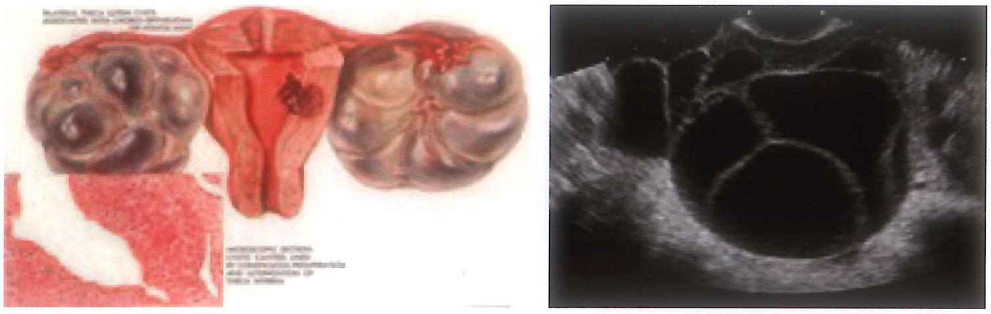
Hemorrhage in CL cyst by US

- Treatment :
    - Conservative follow up: regression usually occurs.
    - Surgical treatment is rarely indicated, only in cases with evidence of internal hemorrhage. Laparoscopy or laparotomy is done to achieve hemostasis.

c) Theca lutein cyst:

This occurs in cases with excess HCG e.g. twins, vesicular mole, and choriocarcinoma or even with normal pregnancy.

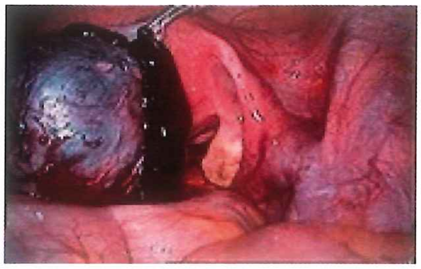
They are hormone dependent and regress completely after pregnancy termination. Iatrogenic excess HCG used for ovulation induction may be a cause.



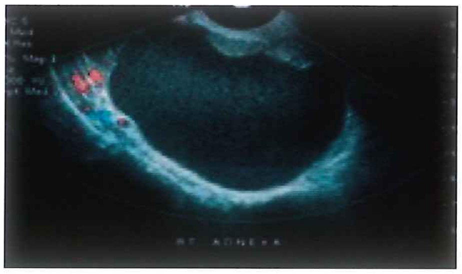
Theca lutein cysts

[d] Endometriotic cysts:

- They represent hemorrhage (menstrual reaction) in an ectopic endometrium present in the ovary. By time blood becomes thick due to absorption of serous elements (chocolate cyst).
- It presents with manifestations of endometriosis as infertility, severe dysmenorrhea and irregular vaginal bleeding (look endometriosis).
- Investigation: US shows ground glass appearance, CA125 is elevated.
- Laparoscopic removal of the cyst is done if it is larger than 4cm, otherwise medical ttt as in endometriosis is indicated.



Endometrioma by laparoscopy

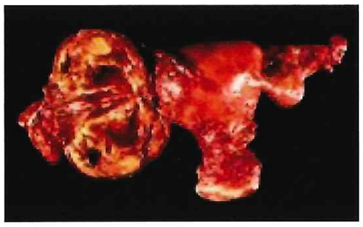


Endometrioma by US

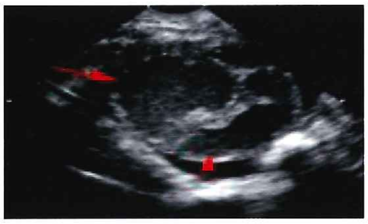
[e] Inflammatory cysts:

Tubo-ovarian cyst or abscess (look P.I.D).

- Patients usually present with chronic pelvic pain and recurrent attacks of acute exacerbations of pain and fever.
- Infertility, Congestive dysmenorrhea or dyspareunia may be present.
- Ultrasound evaluation of this mass and follow up its size while giving medical treatment.



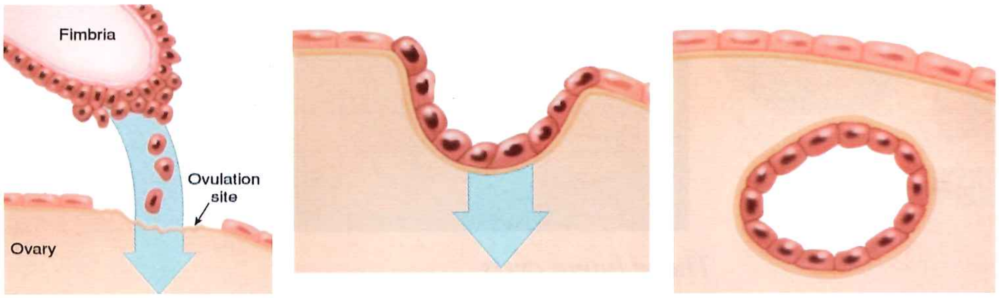
Tubo ovarian mass



Tubo ovarian complex by ultrasound

[f] Inclusion cyst:

- Down growth of surface epithelium into substance of the ovary.
- Usually microscopic, diagnosed by pathologic examination of ovaries after their removal.
- May be the fore-runners for epithelial tumors.



Epithelial cells from the fimbria are released and implant on the denuded surface of the ovary at the site of ovulation. B& C subsequently, an inclusion cyst is formed

[B] Ovarian Neoplasia

[I] Primary Ovarian Neoplasms

Epithelial Tumors: (The commonest)

These tumors arise from the epithelial lining of the ovary.

These include:

- Serous tumors (endosalpingeal).
- Mucinous tumors (endocervical).

The previously mentioned tumors may behave in a benign, malignant or borderline malignant manner.

- Endometrioid tumors (endometrial): usually malignant.
- Brenner tumors: mostly benign.

Pathology of epithelial tumors:

1) Serous tumors:

a. Simple serous cyst and papillary serous cystadenoma:

Gross picture:

- Unilocular or multilocular cyst contains serous fluid.

- The wall is thin, transparent and is smooth in simple serous cyst or shows papillary projections (on outer or inner surface) in papillary type.
- Rupture of one of the cyst locules lead to implantation of papillae on the peritoneum with persistent ascites.
- Papillary cyst adenoma is bilateral in 1/3 of cases and changes to malignant form in about 50% (papillary cyst adeno-carcinoma)

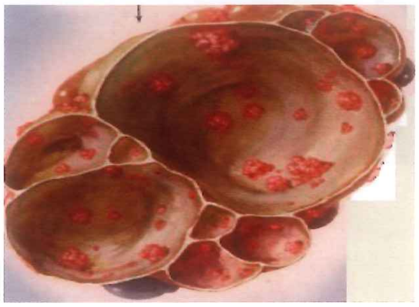
Microscopic picture:

- The wall of the cyst is lined by a single layer of low columnar epithelium which may be secretory, ciliated or non-ciliated (resembling tubal epithelium).
- The papillae have a vascular connective tissue core.
- Psammoma bodies are present which are small calcareous granules formed of lamellate layers of calcium deposit.

b. Papillary cystadenocarcinoma:

The tumor becomes solid or partly solid and partly cystic with invasion of the surrounding and malignant cells in microscopic picture with stromal invasion.

Simple serous cyst



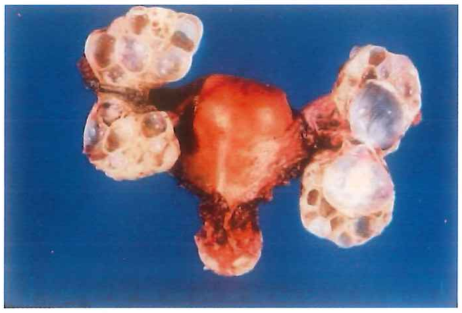
Papillary serous cyst

2) Mucinous tumors:

a. Mucinous cystadenoma:

Gross picture:

- These tumors tend to be large (up to 150kg have been reported). They are rare to be bilateral (10%) and rarely change to malignant type (<5%).
- They are rounded or oval or irregularly ovulated.
- They are usually multilocular containing viscid mucinous fluid which may be altered with blood. Rupture of the cyst leads to implantation of mucin secreting cells in the peritoneum leading to mucinous ascites (pseudomyxoma peritonii). Recurrence of ascites is the role after surgical treatment of the tumor and evacuation of gelatinous material. Intra peritoneal radioactive colloid installation is used to prevent re-accumulation of fluid.



Mucinous cysts

Microscopic picture:

- They are lined with tall columnar mucin secreting epithelium with basal flattened nuclei (resembling the endocervix).

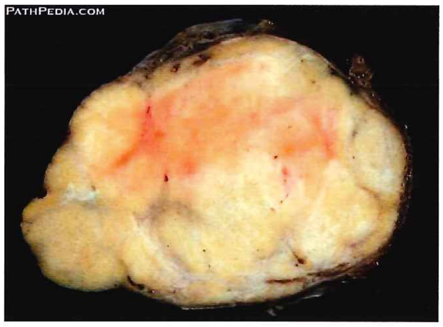
b. Mucinous cyst adenocarcinoma *(As serous).*

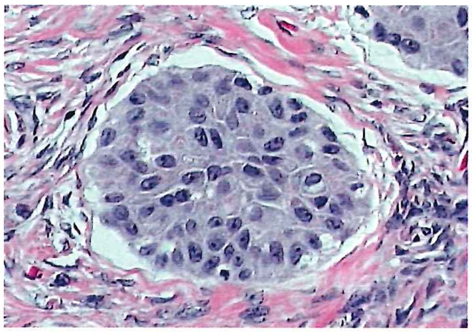
3) Endometrioid tumors:

They are usually malignant partly solid tumors, resembling endometrial carcinoma and commonly associated with it and with endometriosis.

4) Brenner tumors:

- They are rare (1-2%), small solid ovarian tumors, histologically lined by transitional epithelium.
- Microscopically, it shows coffee bean appearance of the nuclei.
- It may secret estrogen (functioning tumor).



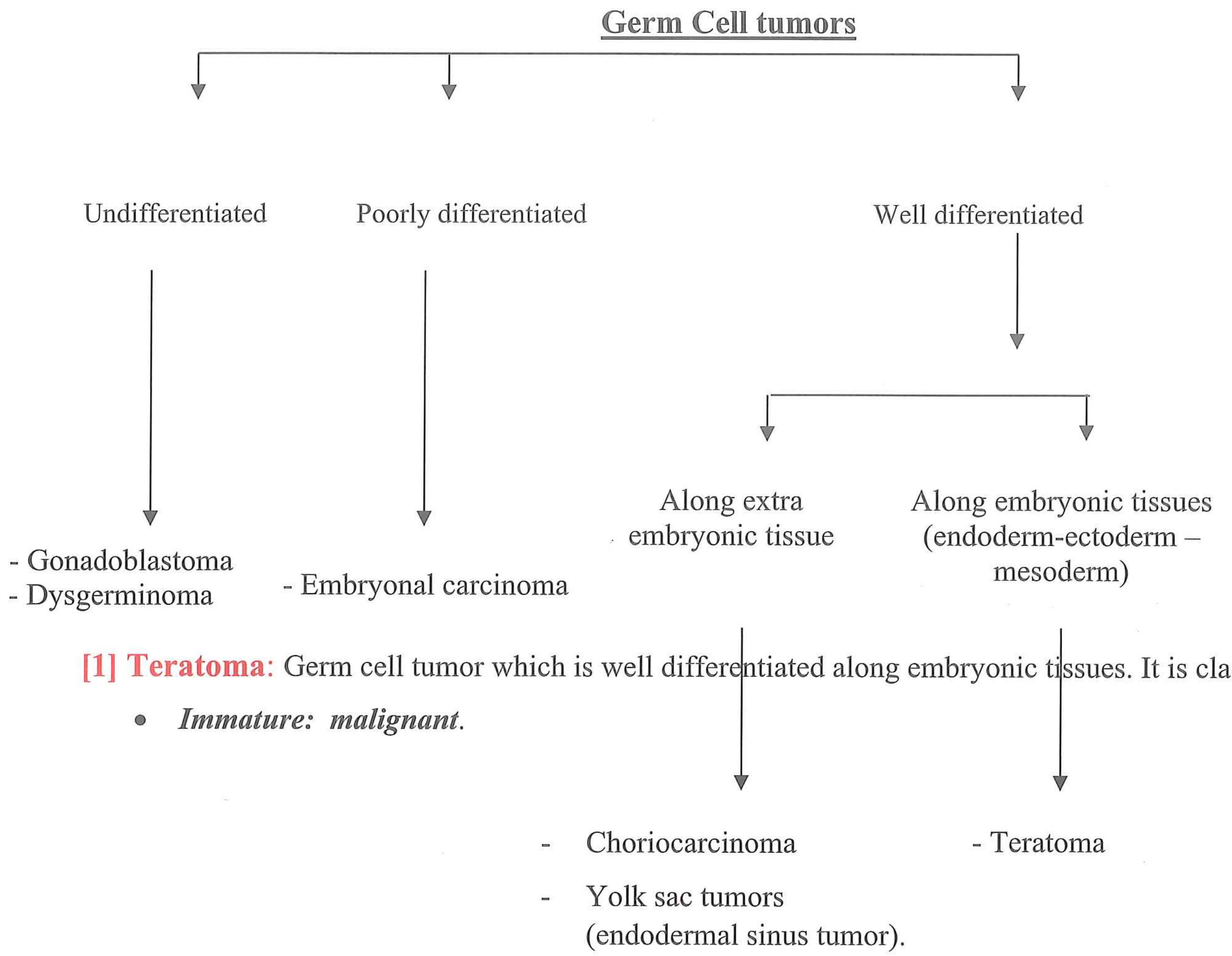


Brenner's tumor

Germ Cell Tumors:

They are derived from primitive germ cells. They constitute 10 – 20% of ovarian neoplasms, over 95% are benign (the commonest of which is dermoid cyst). They usually occur in 2nd and 3rd decades of life and are usually unilateral.

They are classified according to the line and degree of differentiation into:


Germ Cell tumors
Undifferentiated
Poorly differentiated
Well differentiated
Along extra embryonic tissue
Along embryonic tissues (endoderm-ectoderm – mesoderm)
- Gonadoblastoma
- Dysgerminoma
- Embryonal carcinoma
- Choriocarcinoma
- Yolk sac tumors (endodermal sinus tumor).
- Teratoma

[1] Teratoma: Germ cell tumor which is well differentiated along embryonic tissues. It is classified to:

- ***Immature: malignant.***
- ***Mature:***
  - Cystic: Usually benign (dermoid cyst). Malignant transformation may rarely occur (1-2%).
  - Solid: usually malignant, rarely benign.
- ***Monodermal and highly specialized*:**

e.g. Struma ovarii : Composed of thyroid tissue and may produce thyroxin. Clinical manifestations of hyperthyroidism may occur.

N.B.: Benign mature cystic teratoma (Dermoid cyst) :

- The commonest germ cell tumor & commonest tumor encountered in young age.
- 10% bilateral.

Gross:

- Moderate size, slowly growing, has a smooth glistening capsule.
- It is filled with sebaceous material. In the cyst there is a mixture of ectodermal tissues (skin, hair, and teeth), endodermal tissues (intestinal and thyroid tissues) and mesodermal tissues (bones and cartilages).

M.P.:

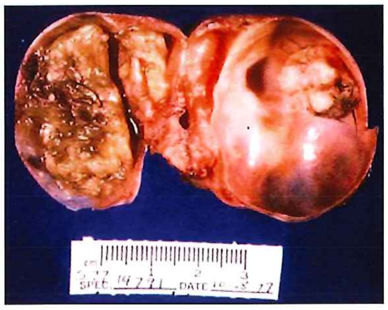
- The wall is usually lined by stratified squamous epithelium.
- In the cyst, there may be a knob called embryonic knob (mamilla) formed of the 3 germ layers.

Clinically:

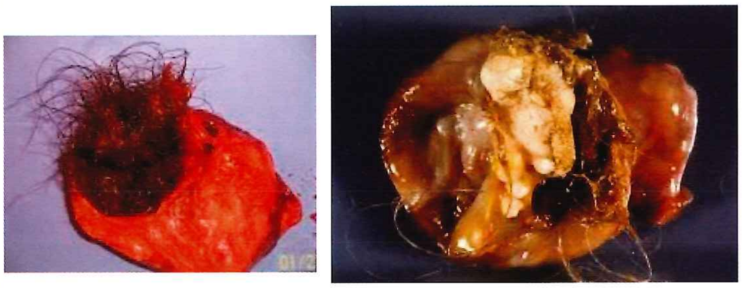
- Dermoid cyst, usually has a long pedicle and present in front or behind the uterus. It is the commonest ovarian neoplasm to undergo torsion.
- In spite of its thick capsule it may rupture causing chemical peritonitis.
- It is either asymptomatic (discovered accidently during examination or U.S) or presents by complications as acute abdominal pain due to torsion.

Treatment:

Ovarian cystectomy, ovariectomy or pan hysterectomy in old age (look treatment of ovarian tumors). Care should be taken during surgical treatment that cyst is removed intact. Soiling of peritoneal cavity by its contents leads to chemical peritonitis.



Bilateral dermoid cysts



Cut section in dermoid cyst with hair and cartilage

[2] Choriocarcinoma:

- *Gestational type* (more common): From metastases of uterine choriocarcinoma or very rarely following ovarian ectopic pregnancy.
- *Non gestational type* (less common): malignant germ cell tumor differentiated along extra embryonic tissues.

The prognosis in gestational type is more preferable than non-gestational type as the response to chemotherapy is better.

[3] Yolk sac tumour (Endodermal sinus tumour):

- Highly malignant germ cell tumor differentiated along extra-embryonic tissues.
- It occurs in young adults.
- It secretes □-fetoprotein which is used for initial diagnosis and follow up of cases after ttt.

[4] Gonadoblastoma:

Benign solid tumor. Most of these patients have abnormal gonads with y chromosome. 50% of these tumors will turn to malignant dysgerminoma.

[5] Dysgerminoma:

- Malignant germ cell tumor with lymphocytic infiltration.
- It may arise from abnormal gonads on top of gonadoblastoma.
- It secretes lactic acid dehydrogenase (tumor markers).
- It is the most radiosensitive tumors.

Sex Cord-Stromal Tumors :

Origin:

They arise from the primitive stroma.

They contain cells of male or female endocrine system.

Sex cord: Male → Sertoli cells.
Female → granulosa cells.

Sex stroma: Male → Leydig cells.
Female → Theca cells.

They include the following:

1) Granulosa theca cell tumors:

- Small sized, yellowish, solid tumors.
- Cells are arranged in micro follicular, macro follicular pseudo adenomatous giving rosette appearance.
- Microscopy it shows Call Exner bodies.
- They secrete estrogen which results in:
  a. In childhood: precocious puberty.
  b. In childbearing period: irregular vaginal bleeding.
  c. In postmenopausal female: postmenopausal bleeding.
- They are low grade malignant tumors (in 20% they behave in a malignant fashion).
- Endometrial hyperplasia occurs in 25-50% and endometrial carcinoma in 5%.

2) Androblastoma (Sertoli-Leydig Cell) Tumor:

- Very rare tumors that resemble the testis with variable differentiation. They secrete androgen → de feminization (amenorrhea-breast atrophy) followed by virilization or masculinization (marked hirsutism – deepening of voice – enlarged clitoris and behavioral changes).

3) Gynandroblastoma : *It* is a mixed tumor (Granulosa theca – Sertoli Leydig) which is either feminizing or virilizing according to hormone production.

4) Theca-cell tumors (thecoma): They are benign tumors of post-menopausal females. They secrete estrogen causing post-menopausal bleeding.

5) Fibroma of the ovary:

- Benign, solid connective tissue tumor.
- It is variable in size and usually has a long pedicle with liability to torsion. It is firm in consistency and C.S shows whorlly appearance.
- Meig's syndrome is an association between fibroma, ascites and Rt hydrothorax (due to irritation of the peritoneum by the mobile tumor).

[II] Secondary Ovarian Carcinoma

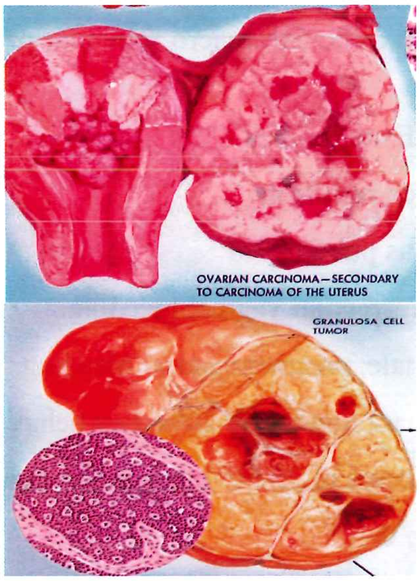
20% of ovarian malignancy. The ovaries may be involved by direct spread, retrograde lymphatics or through blood stream. They are classified into:

Typical: i.e. they have the same microscopic picture of the 1ry tumor.

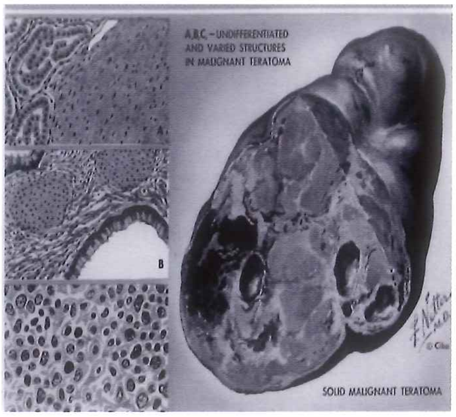
- They are almost always bilateral.
- The ovaries are not markedly enlarged and have nodular pattern with hemorrhage and necrosis.
- Sites of 1ry: may be in uterus.

Atypical: (Krukenberg tumors) i.e. they have specific pathological features, regardless the 1ry.

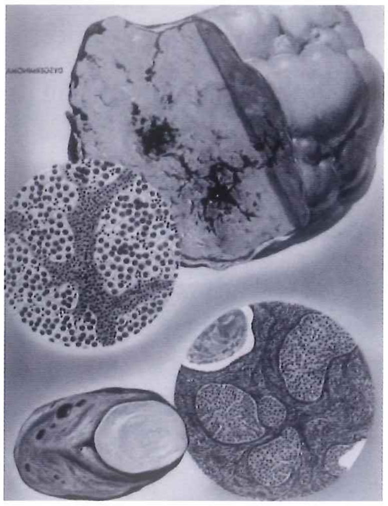
- They are usually bilateral, presenting as nodules in Douglas pouch.
- The ovaries are enlarged and may exceed the size of the 1ry.
- The shape of the ovary is preserved.
- Microscopically, the characteristic cells are signet ring cells arranged in a plexus form.
- Sites of the 1ry may be GIT specially pylorus of the stomach.



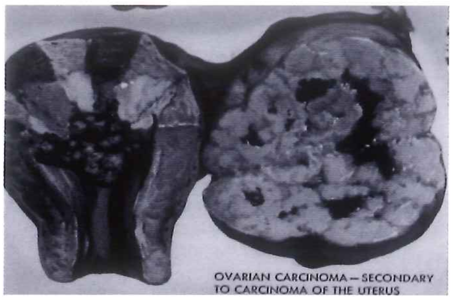
Malignant ovarian tumor


A,B,C – UNDIFFERENTIATED AND VARIED STRUCTURES IN MALIGNANT TERATOMA
A
B
SOLID MALIGNANT TERATOMA

Malignant epithelial tumor



Malignant germ cell tumor


OVARIAN CARCINOMA – SECONDARY TO CARCINOMA OF THE UTERUS

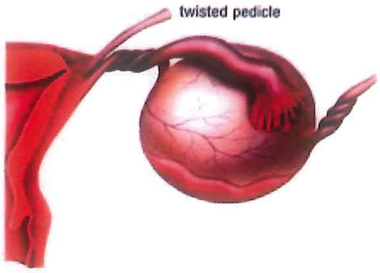
Malignant sex cord tumor

Complications of Ovarian Tumors:

1) Torsion: The commonest is dermoid cyst

Predisposing factors:

- Small sized tumors.
- Long pedicle.
- Absence of adhesions.
- Pregnancy and puerperium.


twisted pedicle

Twisted pedicle

Exiting factors:

- Sudden movement (may be peristaltic movement of intestine).
- After the initial twist, as the pulsations of twisted uterine and ovarian arteries are directed in opposite direction, the twist will be maintained.

Sequelae:

- Congestion: due to obstruction of veins.
- Hemorrhage: due to marked congestion.
- Rupture: due to congestion and hemorrhage inside a cystic tumor.

- Infections and adhesions may result in intestinal obstruction.
- Parasitic tumor i.e., the pedicle sloughs and depends on vascularized adhesions.

Clinically: Acute abdominal pain, vomiting and may be shock (hypovolemic or neurogenic). The tumor becomes tender and tense.

Treatment: Undo the twist and preserve the ovary (if it is not gangrenous). Ovariectomy (ovariotomy) in case of gangrenous ovary.

2) ***Hemorrhage:***

Following torsion or traumatic. Trauma may be direct or during rough examination.

3) ***Rupture:***

Following torsion or traumatic (see before)

Sequelae:

- Simple serous cyst: fluid is not irritant.
- Papillary cyst: implantation of papillae with persistent ascites.
- Mucinous cyst: mucinous ascites (Pseudomyxoma peritonii).
- Dermoid cyst: chemical peritonitis due to irritation by the sebaceous material.
- Infected cyst: septic peritonitis.
- Malignant tumors: spread of malignancy, in the peritoneal cavity.

Clinically:

- Abdominal pain which may be acute and by examination the cyst may disappear if unilocular or change in size if multilocular.
- Others according to the contents.

Treatment: If the tumor is benign, ovariotomy and peritoneal wash.

4) ***Infection:***

Following torsion or from adjacent organ (as appendix) or during puerperium.

Clinically: Constitutional manifestations (fever, headache, malaise, and anorexia), abdominal pain and the tumor become tense and tender.

Treatment: Antibiotics and/ or cystectomy or ovariotomy.

5) ***Impaction (Incarceration)***:

In Douglas pouch with pressure symptoms.

Clinically: Rectal and bladder pain.

Treatment: Ovarian cystectomy or Ovariotomy.

6) ***Malignant Changes***:

- Papillary cystadenoma: 50% change to papillary cyst adenocarcinoma.
- Dermoid cyst: 1-2% change to squamous cell carcinoma or may be adenocarcinoma or sarcoma.

7) Intestinal obstruction:

It occurs in malignant cases infiltrating intestine or may be in benign cases, due to infections and adhesions.

8) During pregnancy, labor and puerperium:

- Torsion, hemorrhage and rupture, may occur during pregnancy and more commonly during puerperium.

Predisposing Factors to Ovarian Cancer:

1) Age:

Usually, postmenopausal patients except germ cell tumors which occur in young age.

2) Parity:

It is a disease of low parity. The periods of pregnancy and lactation are called protected time of the ovary during which there is less risk of malignancy. This is due to decreased surface trauma of the ovary which occurs with monthly ovulation. This decreases the incidence of inclusion cysts and subsequent malignancy.

3) Racial & Socioeconomic factors:

Occurs more in white races & rich countries due to low parity and diagnostic facilities.

4) Contraception:

O.C.P. decreases the incidence of ovarian malignancy (increased protected time of the ovary).

5) Genetic and familial predisposition:

Hereditary non polyposis colorectal cancer syndrome with endometrial, breast, or ovarian cancer ***(10%, Lynch type II).***

Genetic predisposition to epithelial ovarian cancer is due to gene mutations in the breast-ovarian cancer tumor suppressor genes **BRCA1** and **BRCA2**. These genes account for most cases of familial breast and ovarian cancer

Methods of spread of ovarian cancer :

- ***Direct spread***: to surrounding organs as tubes, uterus, colon, bladder
- ***Trans coelomic spread***: Commonest route for spread. exfoliation of cells on peritoneal cavity especially Douglas pouch, paracolic gutters, undersurface of diaphragm, intestine, omentum.
- ***Lymphatic spread:*** To Para aortic L.N. (directly) and also to pelvic L.N.
- ***Blood stream:*** Leads to early spread to distant organs e.g. lung, liver, bone or brain. Retrograde vascular spread may give rise to secondaries in vulva and vagina.

Staging of Ovarian Cancer: (FIGO Surgical Staging):

Stage (I): Tumor limited to ovaries:

a. One ovary, no ascites no malignant cells in peritoneal wash.

b. Both Ovaries, no ascites or malignant cells in peritoneal wash.

c. One or both ovaries with malignant ascites or malignant cells in peritoneal wash.

Stage (II): Extension to the pelvis:

a. To the tubes and/or uterus.

b. To other pelvic organs as colon, bladder and rectum.

Stage (III): Peritoneal implants outside the pelvis and or +ve L.N.

Stage (IV): Distant metastases

Clinical Picture of Ovarian Tumors (Benign and Malignant):

***Symptoms*:**

- Many cases (benign or malignant) are asymptomatic and are discovered accidently. In malignant cases 75% of patients presents as stage III or IV.
- Many cases (benign or malignant) present to internal medicine by indigestion, dyspnea, and palpitation.
- Many cases (benign or malignant) present by complications as torsion, he, rupture, and pelvic pressure symptoms … etc.
- Menstrual irregularities: occurs in:

  Functioning estrogen producing tumors as granulosa, theca cell tumor or functioning Brenner.

  Amenorrhea and hirsutism in androgen secreting tumors as androblastoma.

- Ovarian cachexia: In large benign and in malignant tumors.
- Manifestations of metastases occur in advanced malignant cases e.g. Jaundice or pathological fractures.

***Signs*:**

- General pelvic or pelvi-abdominal mass which may be cystic (usually benign) or solid (usually malignant or) with central dullness and resonant flanks.
- **Criteria of malignancy** :
  - *History :*
    - Old age > 40ys.
    - Rapid growth.
    - Wasting.
    - Postmenopausal bleeding may be present.
  - *General ex :*
    - Cachexia, Lt supra clavicular LN (Virchow's gland).
    - Pleural effusion (however may be Meig's syndrome)-breast mass (associated malignancy or krukenberg).
    - Unilateral L.L. edema. This could occur due to thrombophlebitis from toxins of malignancy.

- *Local ex* :
    - Solid.
    - Bilateral.
    - Fixed.
    - Ascites.
    - Nodules of Douglas pouch.
- *Operative findings* : See later

Special Investigations of Ovarian Tumors: (Benign and Malignant)

The aim of investigations is to document the nature of the tumor and to assess the stage of the disease if malignant.

Investigations to document diagnosis:

- U.S. confirms the origin of the tumor and its nature. Cystic swellings (unilocular or multilocular) are usually benign. Solid swellings or partly solid and partly cystic with hemorrhage and are usually malignant. C.T or MRI may be needed to confirm origin of the mass and to detect omental, L.N or colonic infiltration in malignant cases.
- Tumor markers: C.A. 125 (specific for epithelial tumors), □ fetoprotein, HCG and L.D.H. (Lactic acid dehydrogenase).
- RMI (Risk of malignancy index): age of the patient (menopausal or not), criteria of malignancy by US (present or absent) and level of CA125. If more than 200, then the RMI is high and oncology assessment is needed.

Investigations to detect complications (spread, if there is suspect of malignancy): Chest x-ray, liver and bone scan, abdominal CT or MRI.-I.V.P. may be done to detect the relation of the ureter to the swelling.

Investigations to check surgical fitness: ………..

Exploratory laparotomy:

In malignant cases as the staging is a surgical one, the most important diagnostic procedure is exploratory laparotomy (diagnostic and therapeutic). Midline sub umbilical incision is done with aspiration of ascetic fluid (if present) or peritoneal wash and aspirate and assessment of the pelvis and abdomen e.g.:

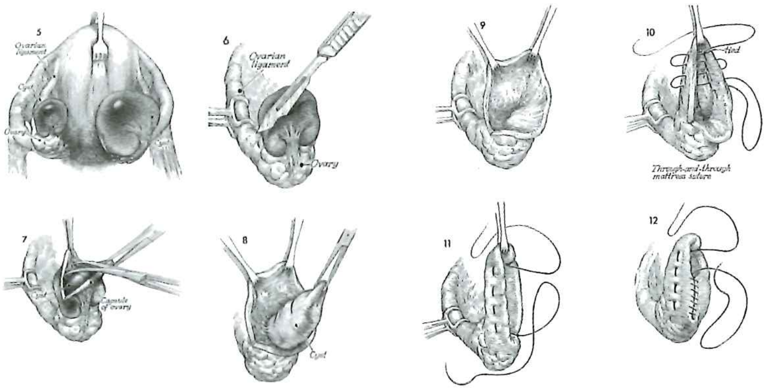
Operative findings suggestive of malignancy:

- Bloody ascites.
- Bilateral tumor.
- Solid or partly solid and partly cystic.
- Fixed.
- Hemorrhage and necrosis in the tumor.
- Rupture of the tumor capsule and infiltration of the surrounding.
- Nodules of greater omentum and peritoneum.
- Multiple biopsies from omentum, paracolic gutters, and peritoneum of the undersurface of diaphragm and L.N biopsies (Pelvic and par aortic) are essential.

Treatment of benign Ovarian Tumors:

1. ***Ovarian cystectomy:***

   Incising the capsule of the cyst and enucleation of the cyst and ensure hemostasis. It is indicated in young are to preserve the ovary.

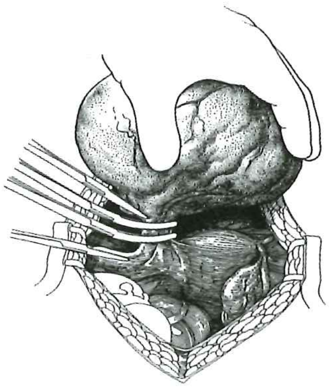

5
Ovarian ligament
Cyst
Ovary
6
Ovarian ligament
Ovary
9
10
Tied
Through-and-through mattress suture
7
Cyst
Capsule of ovary
8
Cyst
11
12

Ovarian cystectomy operation (enucleation of the cyst and closure of the bed

2. ***Ovariectomy*** :

   Removal of the ovary containing the tumor. It is done, if the tumor is large and adherent or complicated by torsion.

N.B.: Ovarian cystectomy and ovariectomy could be done by laparoscopy or by open laparotomy. Laparoscopy is associated with short easy post-operative convalescence, less post-operative adhesions and no abdominal scar. It is risky in cases with dermoid cyst as accidental opening of the cyst with peritoneal contamination with its contents lead to severe chemical peritonitis.



Ovariectomy

3. ***Abdominal panhysterectomy*** : (T.A.H. and B.S.O)

   In patients over 45 years.

4. ***During Pregnancy:***

- Small cysts < 7cm (usually functional cysts, mostly corpus luteum cyst): follow up by U.S is done.
- Large cysts > 7cm (the commonest is dermoid and serous cysts) :

  Surgical treatment is preferably delayed till the end of 1st trimester (to avoid risk of abortion).

  If the case presented with obstructed labor, C.S and management of the cyst are done in the in the same setting.

- Operative interference is done; regardless gestational age if there is complications or suspect of malignancy.

Treatment of Malignant Ovarian Tumors:

■ Principle:

It is surgical ttt in most cases. The idea of this is that chemotherapy gives very good results in these cases, so removal of the tumor or as much as possible will help to decrease the dose and toxicity of chemotherapy and enhance its effect on the tumor cells.

■ Lines of ttt:

Surgical measures:

- Debulking operation: Panhysterectomy, appendectomy and omentectomy are done in early cases and debulking is done in advanced cases. The best results with debulking is obtained when residual tumors is < 1cm.
- Conservative surgical treatment could be done in early cases (stage Ia, well differentiated tumors with intact capsule) if the patient is young and desiring pregnancy: Unilateral salpingeo-ovariectomy only is done and close follow up. If pregnancy is not desired or in advanced cases, there is no place for conservative surgery.

Adjunctive ttt:

- Every case will need an additional post-operative treatment chemotherapy except stage (I) (a), well differentiated tumors with intact capsule, in which only surgery is enough.
- Radiotherapy in the form of intra peritoneal instillation of radioactive material in pseudo-myxoma peritoneii and in treatment of dysgerminoma which is radiosensitive.

- 2nd look laparotomy:
  - It is a planned re-operation to assess completeness of treatment after a course of chemotherapy in cases with no evidence of clinical disease.
  - It has the same principles of the original exploratory laparotomy.
  - Its role is doubted as it is too much to be just an investigation for follow up. And nowadays it is replaced by other investigative tools including laparoscopy.

Prognosis of ovarian cancer:

Generally, this is the worst genital tract malignancy as it is usually diagnosed in advanced stages.

Prognosis depends on stage – histological differentiation – optimum versus sub-optimum surgical treatment – response to adjuvant chemo or radio-therapy.

Paraovarian Cyst

Etiology:

It arises from any of the embryonic remnants of Wolffian ducts between the 2 layers of the broad ligament.

Pathology:

Thin walled-unilocular cyst, lined by flattened epithelium, distending the broad ligament and displacing the uterus to the opposite side. The fallopian tube is stretched over the cyst and the ovary is separate from the cyst but attached to a point in its post. wall (mesovarium). It can compress the ureter with back pressure on the kidney.

Diagnosis and treatment:

Pressure symptoms on the ureter and by examination the cyst is felt to one side displacing uterus to opposite side

Enucleation of the cyst after opening the peritoneum of the broad ligament. There is higher incidence of ureteric injury during surgery. This could be prevented by pre-operative I.V.P. and ureteric catheter.